THE RELATIONSHIP BETWEEN ENGINEER SKILL ABILITY TOWARD EMPLOYER SATISFACTION MODERATED BY EMPLOYER IMPRESSION

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ABSTRACT

This study investigates the skills required by industrial sector employers for entry-level jobs and attempts to investigate the factors pertaining to the valuable skills that influence the employability of new engineering graduates. This study investigates these factors from various aspects to establish what employers expect of their newly hired engineering employees and seeks to find out if there are any differences in the perception among employers regarding the skills and employability of engineering graduates at industrial community. Employers consider certain skills as top priority before they decide to employ, sometimes, the nature of industries will determine the types of skills needed. This study used simple random sampling to select respondents that comprised senior managers from manufacturing companies in Malaysia, chosen from the 2015 Federation of Malaysian Manufacturers' (FMM) Directory. Questionnaires distributed to senior managers and researcher was able to collect data from 195 respondents with the response rate of 41%. The data was then cleaned of missing values and tested for normality. Statistical Package for the Social Sciences (SPPS) version 22 was employed to measure the research hypotheses. The findings indicate that, in order to be hired, engineering graduates must be equipped with skills. Fundamental general skills, engineering skills and self-emotional intelligence skills are among the skills found to be valuable. Findings also demonstrate that the employers' impression is highly moderated the relationship between engineering and self-emotional intelligence skills. This study has identified two new scalars of Personality Skill and Behavioral Skill that hopefully could contribute to the academic world.

Keyword: engineering graduates' employability, engineering skills, generic skills, employers' perception

ABSTRAK

Kajian ini meneliti kemahiran tertentu yang perlu dimiliki oleh graduan kejuruteraan untuk diambil bekerja oleh pihak industri dan cuba untuk menyelidik faktor berkaitan dengan kemahiran penting yang boleh mempengaruhi kebolehpasaran graduan kejuruteraan yang baharu. Kajian ini juga merincikan dari pelbagai aspek untuk menentukan jenis kemahiran yang dikehendaki oleh pihak majikan dalam pengambilan pekerja baharu. Kajian ini juga menentukan sekiranya terdapat perbezaan pandangan dan pendapat antara para majikan berkaitan dengan kemahiran graduan kejuruteraan dalam komuniti industri. Terdapat beberapa kemahiran yang diutamakan oleh majikan sebelum mereka membuat keputusan untuk mengambil pekerja dan adakalanya sifat industri tersebut yang akan menentukan kemahiran yang diperlukan. Kajian ini menggunakan teknik persampelan rawak secara mudah untuk memilih responden yang terdiri daripada pengurus kanan di syarikat pembuatan di Malaysia. Sampel diperoleh daripada Direktori Syarikat Pembuatan Malaysia yang diterbitkan pada tahun 2015. Borang soal selidik diedarkan kepada pengurus kanan dan pengkaji berjaya mendapatkan maklum balas daripada 195 orang responden dengan kadar respon sebanyak 41%. Data kemudiannya dibersihkan dengan menggugurkan data yang hilang sebelum diuji untuk ujian normaliti. Hipotesis kajian diukur menerusi perisian Statisitik untuk Sains Sosial versi 22. Dapatan memperlihatkan bahawa graduan kejuruteraan perlu mempunyai kemahiran sekiranya mereka mahu ditawarkan pekerjaan. Kemahiran asas, kemahiran kejuruteraan, dan kemahiran kepintaran emosi merupakan kemahiran yang dilihat bernilai untuk kebolehpasaraan graduan kejuruteraan. Dapatan juga memaparkan bahawa tanggapan majikan bertindak sebagai penyederhana yang tinggi dalam hubungan antara kemahiran kejuruteraan dengan kemahiran kepintaran. kajian ini juga telah mengenal pasti dua skalar baharu Kemahiran Personaliti dan Kemahiran Tingkah laku yang diharapkan boleh menyumbang kepada dunia akademik.

Kata kunci: kebolehpasaran graduan kejuruteraan, kemahiran kejuruteraan, kemahiran generik, pandangan majikan.

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Hasan bin Saleh
August 21, 2019

DEDICATION

This thesis dedicated to my lovely family:

My lovely wife

Hasfa Hazrina binti Yaacob

My lovely Son

Muhammad Haziq Danial bin Hasan

Muhammad Hafiq Danish bin Hasan

Muhammad Haffiy Dayyan bin Hasan

With Love

Hasan bin Saleh

August 21, 2019

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LIST OF ABBREVIATIONS

ABET	-	Accreditation Board for Engineering and Technology, USA
AUS	-	Australia
ANOVA	-	Analysis of Variance
BEM	-	Board of Engineers Malaysia
COB	-	College of Business
DOSM	-	Department of Statistic, Malaysia
DEST	-	Department of Education, Science and Training, Australia
EAC	-	Engineering Accreditation Council Malaysia
ESECT	-	Enhance Student Employability Coordination Team
EFA	-	Explanatory Factor Analysis
EU	-	European Union
EES	-	Engineering Employability Skills
EGE	-	Engineering Graduate Employability
FMM	-	Federation of Malaysian Manufacturers
FDI	-	Foreign Direct Investment
GE Blue Print	-	Graduate Employability Blue Print
GE	-	Graduate Employability
HEIs	-	Higher Education Institution
ILMIA	-	Institute of Labor Market Information & Analysis
ICT	-	Information and Communication Technology
IEM	-	Institution of Engineers, Malaysia
KSAOs	-	Knowledge, Skills, Abilities and Others Characteristics
KMO	-	Kaiser Meyer Olkin
MOHE	-	Ministry of Higher Education Malaysia
MOHR	-	Ministry of Human Resources
MQA	-	Malaysian Quality Assurance
MEB	-	Malaysia Education Blueprint 2013 – 2025
MIDA	-	Malaysian Investment Development Authority
MEES	-	Malaysian Engineering Employability Skills
NKEAs	-	National Key Economic Areas
NCVQ	-	National Council for Vocational Qualification, UK
NAM	-	National Association of Manufactures
PE	-	Professional Engineer
PAE	-	Professional Assessment Examination
PCA	-	Principles Component Analysists
SCANS	-	Secretary's Commission on Achieving Necessary Skill, USA
SLIM	-	*Skim Latihan 1 Malaysia*
SESNW	-	Survey of Employability Skills Need in the Workforce
SPSS	-	Statistical Package for the Social Sciences
SD	-	Standard Deviation
TVET	-	Technical Vocational Education Training
UUM	-	*Universiti Utara Malaysia*
UK	-	United Kingdom
USA	-	United State America

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Industries today are demanding that all new workers be equipped with certain skills to be successful in their job and career (Yuzainee *et al.* 2012). Today, employers not only looking for good workers with basic literacy skills like oral communication, writing, listening and reading skills together with basic knowledge of science and mathematics, but are also looking for employees who have high level of thinking skills, like problem solving, reasoning, learning skills, decision-making and creativity (Latisha & Surina, 2010). Organizations also need to develop their own human capital resources based on an examination of the essence of employability (Rao *et al.* 2011). Moreover, since the 1980s, employers looking for workers or employees that can adapt to change, especially in term of services, products and processes, in fact, it is a major requirement by employers (Grip, Loo, & Sanders, 2004).

Of late, with rapid advancements in technology and continuous innovations, the competition for employability has become a significant challenge, and sustaining appears to be difficult, given the current scenario, without an adequate and proper learning process (Rao *et al.* 2011). For this reason, leaders in the industrial and government sectors have been calling on fresh graduates to master the employability skills, especially problem-solving, teamwork skills, communication skills and decision-making (Yuzainee *et al.* 2012).

Furthermore, employers today require graduates who possess the "know- how" when face with the real problems (Yuzainee *et al.* 2012). Employers prefer engage graduates from public universities because it is assumed that they have the employability skills and the necessary academic qualifications that are important and essential for today's job environment (Latisha & Surina, 2010). They also stated employability means to readiness of work, such as possessing the skills, understanding and information about commercial matters that can enable graduates to make valuable contributions toward the success of the organization. Usually, when employer want to make seleetion of graduates, employers are more concerned with their understanding of business and their work experience (Rao *et al.* 2011).

Furthermore, Rao *et al.* (2011) mention employers today would only consider graduates with relevant skills. They claimed that workers should perform to the best of their abilities and employers are unwilling to spend any resources on training programs for graduates. It is also important to understand that skilled workers are very much needed, and are vital for an industry and for a region to maintain its competitive edge, not only for now, but also for the future (Kalafsky, 2008). In addition, the highly innovative industrial sectors are in great need of workers with employability skills (Grip, Loo, & Sanders, 2004). The importance of preparing skilled workers for the changing industrial environment should be emphasis and it is crucial that highly skilled graduates be produced who can adapt and match to the fast changes in technology.

It is crucial that highly skilled graduates be produced who can adapt and match to the fast changes in technology. Educators will also have to leverage on their strategies, and especially highlight recruitment to the technological industries to meet the rapidly challenging requirement of student recruitment and technological industries. Those involved in advanced manufacturing industries agree with the importance of higher education institutions (HEIs) as sources of recruitment and training (Kalafsky, 2008).

Moreover, the employability of workers in some industrial sectors also depends on the extent to which employment jobs required to sustain the industry growth. The demand for employability, in turn, relies on the various developments intensity in the sectors and the character of the markets with regards to the sale of the services or products of the firms in those sectors (Grip, Loo, & Sanders, 2004).

Due to continuous changes in the workplace, basic and traditional skills have less value and hardly help individuals to find suitable jobs or employers to improve their business. On the one hand, employer expectations should be met via a supply of graduates who are equipped with applicable and up-to-date competencies. It is obvious that to gain a competitive edge or to be ahead of competitors, employees must acquire relevant skills to ease them to keep their jobs, build positive relationships and perform effectively with their customers and colleagues (Sahni, 2011).

Today, academic knowledge must be complemented with skills for securing a job. The modern world requires students to excel and grow (Munohsamy, 2015). Specifically,

the issues of employability of engineering graduates are said to be critical in the current environment because of the rapid changes to the economy brought about by globalization, while work itself has also changed dramatically (Jain & Jain, 2013). Moreover, organizations are asking for higher commitment employees and for highly flexible employees at the same time, (Heijde, 2006).

Unemployed graduates in Malaysia was 3% in January 2015, the same as in December 2014. An average of 3.26% rate of unemployment, indicates that years 1998 and early 2015, it was high in March, 1999 at 4.5% and 2.70% low at August 2012 (Department of Statistics, Malaysia, 2015). This data also show the imbalance in the labour market for two years, especially in the month of October 2014. Even though in Malaysia, the rate of unemployment is still low in comparison to that of the European countries or the United States, unemployment is a great concern (Ismail, 2011) as the nation moves towards becoming a modernized country in 2020.

In February 2015 however, the unemployment rate rose from 3.1% in January 2015 to 3.2%. Moreover, on a year-to-year basis, the unemployment rate for the current month remained the same as in February 2014, and rate for the seasonally adjusted unemployment for February 2015 was 3.2%, up by 0.2% compared to 3.0% in the previous month (Department of Statistics Malaysia, 2015).

Furthermore, according to a tracer's study report from Malaysian Ministry of Higher Education, (MOHE), (2015), 16.2% graduates work at the private multinational firms

meanwhile 40.8% graduates a working in local private firms, compared to 2014, where 17.7% were working in multinational private firms and 44.5% in local private firms (Tracer's Study, 2015). This data shows that the number of graduates working in multinational private firms decreased by 1.5% from 2014 to 2015, while the number in local private firms decreased by 3.7% for the same years.

Meanwhile, among first degree engineering graduates, the tracer's study data of 2015 show 17.6 % work in private multinational companies and 32.7 % work in the local private sector, compared to 21.4 % and 41.9 %, respectively, in 2014 (Tracer's Study, 2015). This data show that the percentage of engineering graduates hired by the industry decreased by 3.8 % from 2014 to 2015 in the multinational private sector in Malaysia.

In 2015, the percentage of graduates with engineering background from HEIs was 20.9% compared to 24.48% business and arts graduates at 45.38%. This means the supply of engineering graduates is still low compared to the demand of the Malaysian industry as it moves toward a developed country status by 2020. Hence, our country stills lack the graduates from engineering background that needed to achieve the demands and requirement of the present industry players.

These data are supported by the National Graduate Employability Blueprint, 2012 – 2017, where employers note few poor factors possessed by graduates which 27.7 % a choosy for company or job, 30.2 % for skills mismatch, English poor command

(55.8%), 23.8% lack of in-depth skills and knowledge, 25.9 % have no ability to solve the problem and poor character, attitude or personality (37.4%).

It should also be noted that according to the Malaysian Labour Force Survey, for those person who are not employed are include as the person who available to work, and at the same time, those who are not working, during the reference period. It means that person a not active to look or find job at the reference time period, although there are no published records on the unemployed individuals as per mention by Department of Statistics, Malaysia (DOSM) via email at 6 May 2015.

1.2 Identification of research gaps

Poo *et al.* (2012) studied the demand and supply between the mismatch for skilled workforce in Malaysia. According to her analysis, the amount of labour required by the market compared to the output of skilled engineering graduates has decreased and the output growth is faster than the manufacturing sector growth of employment, especially in the high skilled categories. This means an engineering skills gap exists due to the mismatch of the output from the HEIs and the demand from industry.

MOHE, (2012) have produce The National Graduate Employability Blueprint for years 2012 to 2017 identified six major issues, supports this and one of the six is a job mismatch. This is because the market nowadays requires more engineering graduates but most graduates from HEIs comprise the arts and social science fields.

Previous studies have not placed any emphasis on relationships; yet, they can be a guide to help employers decide on the important skills. According to Grip, Loo, and Sanders (2004), "To get a more detailed picture about workers' employability, the collection of specific data from a firm could be extremely helpful. For example, the data about an individual organization may make it more possible to construct the employability index of the firm".

In addition, Ramli Mustapha (1999), Gurvinder Kaur (2008), Yuzainee and Zaharim (2012), Basri (2012) and others, has carried out numerous studies pertaining to engineering skills in Malaysia, which have dwelt on the subject of the employability of engineers. Reports and guidelines have also been provided. For example, the then Ministry of Higher Education, Malaysia, came out with the National Graduate Employability (2012) Blueprint as a guideline for employability. However, this study focuses on employers' demands with respect to the nature of the industry in Malaysia, and differs in terms of the geographical area, the demographics of the industry players and the environment.

Numerous studies have been carried out and discussions have been held on the classification of the most important factors for engineering skills. However, most of the studies have failed to define explicitly the need and demanded skills by employers, and the issue is still debatable.

Hogan *et al.* (2013) discussed this matter in their focal article; yet, they did not mention what the foremost skills needed by employers are. They only raised the question about what employers want from their newly hired employees. Bloom and Saeki (2012), who found that the skills gap that exists concerning employability among graduates still remains and more research is required to examine this gap.

Additionally, previous findings about the desired employability skills have mostly been based on studies conducted in the USA, and not in developing countries, and hence, cannot be generalized to the Malaysian workplace environment (Mohd Sahandri *et al.* 2012). This research identifies skills of the engineering as desired by Malaysian employers and kind of skills graduate engineers must be equipped with in order to become a valuable employment resource.

In addition, numerous studies have been done on Impression Management. Researcher such Wayne and Ferris (1990) suggested that impression should focus at the supervisor, individual and job. However, this study only stresses on the effect of supervisors on subordinates without covering engineering workers.

Furthermore, Bolino, and Turnley (1999) conducted a study to measure impression in organizations using Jones and Pittman Taxonomy. They found more studies using new measurements are needed. This is one of the reasons employers' impression is used as a moderator in this study to measure the impression of employers of engineering graduates in the relationship between employers' satisfaction and the other variables.

As far as researcher's knowledge, this has not yet been discussed in terms of engineering graduates' skills.

Furthermore, Bolino *et al.* (2006) conducted a study regarding the impression management effect on supervisors' rating of organizational citizenship behaviour. They found that organization rating a likely between supervisors' focus on impression management and supervisor focus itself. This study had 122 supervisors from 35 different companies. They focused on employees who work at the sales department only and did not discuss the supervisors' focus from the industrial context.

Viswesvaran *et al.* (2001) studied how impression scales in personality inventories of 826 managers predict managerial work performance; they found interpersonal interactions are important in at least one job category. Again, this study only focuses on the employees' job performance of perceived by managers; the authors did not discuss it from the employers' impression perspective of the engineering graduates. It is important to further investigate employers' impression, especially of engineering graduates, as there is greater focus now on industrial players to forge further ahead.

Peck and Levasha (2017) studied impression management interview and job performance. They found, it is often utilized in interview rather than in job performance ratings. Due to this, there is a need to further investigate employers' impression of engineering graduates' performance, especially on behaviour, positivity and motivation towards the task given.

Chen and Fang (2008) conducted a survey on the impression management effect at the organizational that have relationship with politics-performance in Taiwan. The data was gathered from 10 state-owned enterprises with have 290 employee work as a full-time workers. They examined supervisor focus and job focus. They found that job focus impacts significantly between relationship and perception about organizational politics; if the perception is low, workers who involve in high level tactics of job focus-related impression management receive better ratings compare to those who have low level tactics. However, since they studied organizational politics performance and not performance from the industrial perspective, a gap exists. Hence, there is a need to investigate supervisor focus and job focus from the perspective of employers' impression of engineering skills and its effect on employers' satisfaction from the industrial context.

Due to the various findings in the literature about the gaps related to engineering graduates' skills, it is important to conduct further investigations into the perception and satisfaction of employers concerning the hiring of engineering graduates. Especially with regards to what employers want and the engineering skills that are needed in the market nowadays as starting points to create a new dimension of employability among engineering graduates in Malaysia.

1.3 Problem Statement

Today, the changing of technology have change the surrounded and environment of engineering working. Manufacturing companies are among the main players in this country to achieve developed nation status by 2020. To this end, manufacturing companies need engineering workers to be equipped with the skills needed by them (Jackson, 2009).

The government, through the HEIs, is mainly responsible for moulding and equipping future engineers with the skills needed by the manufacturing industry. To ensuring the progress and success of the company or industry, skill is very important and crucial (Mohd Yusof *et al.* 2012). The issue is whether or not engineers has been equipped with the required skills by the manufacturing companies. A clearer understanding on the expectation of the "good to have skills" and "must have skills" in engineering field at 21st century (Alena, 2017) is a must for manufacturing companies today to achieve their goals and mission.

The skills required by the manufacturing industry must aligned with the nature of the company and skill is the ticket for engineers to get promoted. Hence, skill is important at the workplace for helping people to improve career opportunities and changes (Mohamad Satar, 2010).

Engineers who have skills, which do not meet or accordance to the demand and needs by manufacturing industry, usually will not be hired because of the mismatch with

the skills needed. The consequences from this are that there will be a number of jobless engineers because doesn't have skills required from manufacturing sector. Employers' expectations and perception are essential in ascertaining essential skills (Zaharim *et al.* 2009). Skills are therefore important (Jackson, 2009) for engineers to be hired.

In addition, there are some skills considered crucial to certain manufacturing companies. Engineers whose skills do not suit or are not aligned with the company will not be hired. Functional or discipline area skills are vital (Jackson, 2009) to certain manufacturing companies. Therefore, a skill must meet the needs of the manufacturing companies today and is important to determine job opportunities for engineers.

Furthermore, the engineers' skills that can guarantee recruitment by companies, must be determined. A forecast must be made of the skills needed by the manufacturing companies and HEIs can make the necessary planning to align the curriculum with the skills needed. Apart from that, whether or not manufacturing companies are satisfied with the engineers who work for them must be reviewed. One cannot assume or make predictions without data as to whether or not the skills of engineers are suitable for or satisfy the manufacturing companies. From this, the real skills needed of engineers can be determined and the necessary amendments to create, upgrade and enhance the skills needed to be made.

Dacre and Sewel (2007) found from their survey that one-third of graduate vacancies is because of lack of explicit skills and knowledge, emphasizing the fundamental and

ongoing skills mismatch. More relevant skills according to demand by the manufacturing companies must be provided. Even though engineers may be equipped with the necessary skills, manufacturing companies are not satisfied as some other skills, like fundamental skills, emotional intelligence skills, motivation, specific skills, adaptive skills and personal skills, are not available among the graduates.

Moreover, employers' impression is essential and important in terms of engineering graduates' motivation, appearance, discipline, attitude, behaviour, maturity, positive attitude and quality. Employer impression means, how an employee can impress the employer regarding the output of job that have been done by them to show that they have try and doing their best to make the job as good as they can. In this regard, people are more motivate to manage impression when their behaviour rely on one who controls valued outcomes (e.g., supervisor) (Leary & Kowalski, 1990). From this, employers can determine the character of the engineering employees in their company. It is also fundamental for promotion and continued progression along the employees' career path.

Engineering graduates must therefore demonstrate the skills they have to impress the employer. They have to show their ability to the employer and how well prepared they are to enter the challenging world of work. It is up to them to impress their manager (Rao *et al.* 1995) regarding the skills they are equipped with. If the engineering graduates fail to do so, and the employers are not impressed with their skills, employers will not hire the engineering graduates.

In other words, the engineering graduates have to show that they are equipped and have been prepared well and ready to enter the work environment with the right skills. They must be resourceful through ideas, expressing on controversial organizational issues or stimulating for organizational change (Deter & Edmondson, 2011; Dutton & Ashford, 1993; Ashford, 1998). This is a must in today's job environment so that companies can get the best outcomes from their engineering workers.

Employers will assess their employees, especially in terms of their fundamental, teamwork, specific and emotional skills. These characteristics are crucial for determining recruitment by the employer. Graduates must try to impress others including employers by promoting good images (Rosenfield, Giacalone, & Riordan, 1995). These characteristics can help employers to identify the right recruits for the company.

In addition, employers look at the engineering graduates from other angles, such as job focus, to determine the right candidates for the job. An employer will observe and look at the ingratiatory behaviour of engineers. By this, an employer can determine the suitable graduates to be hired in their company. It is not easy in today's challenging and global economic environment to find a perfect and suitable engineering graduate who fulfils the needs of industry players.

Based on the few studies mentioned above, and to the latest of researcher's knowledge, regarding the employers' impression as a moderator, it has not been done yet to examine the extent of its influence in the skills-employer satisfaction relationship.

Moreover, the skills gap among engineering graduates remains unaddressed in the literature. This is a problem that must be handled and this study bridges this gap. This fact is supported by Bloom and Saeki (2012) who found that the skills gaps has not been fully addressed. The National Graduate Employability Blueprint, 2012–2017, found that the utmost issues for employability for engineering graduates' skills are job mismatch, skills gap, lack of communication and other necessary skills especially about job mismatch. Alena (2017) also mention regarding the lacking of communication skills among the engineering graduates. Smith et, al (2019) also found that communication, appropriate technology, leadership, team work and problem solving among the skills have been identified as an outcomes gained from their engagement a not been well develop.

In addition, a mismatch exists between the stakeholders' expectations and engineering graduates' skills. Stakeholders expect the right skills to be cascaded to industry and be relevant to market demand. Alena (2017) confirmed that skills must be relevant to market demand. Furthermore, the mismatch between the engineering graduates' quality and industry's needs must be address immediately as employers are dissatisfied

with the quality of graduates, (Cox & King, 2006). It is mean stakeholders expect the right skills to be cascaded for the industry and be relevant to the market demand.

Some companies feel that the skills of engineering graduates are not satisfactory as they are deviated from the industry's demands. Ramlee (1999) stated that the industry has opined that Malaysian engineering graduates have sufficient skills, however, not at par with employers' expectations. Zaini (2005) found that engineering graduates rely heavily on academic qualifications to acquire jobs without required skill from employers.

In short, engineering graduates should possess an excellent academic records and specific soft skills as well (Shaymalee, 2013), and know how to market themselves with requisite skills their have (Yuzainee *et al.* 2012).

Furthermore, Employers impression's influence on the hiring of engineering graduates is an ongoing debate. Shaymalee (2013) posited that engineering graduates differ from others; hence, it is vital to impress employers with skills.

In addition, engineers today are posed with new demands and challenges in the work environment, which in turn, produce fundamental and rapid changes to the environment (Shaymalee, 2013). Hence, employers today insist on a high level of skills among graduates (Husain *et al.* 2010).

Basri *et al.* (2012) finding is supported by Ramli Mustapha, Zaharim, Mohd Zaidi Omar, Norhamidi Muhamad, Yuzainee & Azah Mohamed (2009). They also mentioned about the skills of engineering graduates to create, do experiments and examine and data interpret, including the knowledge on contemporary issues. However, the gap and the graduate engineering skills needed, including employers' impression, has not been discussed.

Based on the reasons given above, the employability factors for the engineering graduates are crucial to be further examine. The research questions and objectives of this study are discussed next.

1.4 Research Questions

This study investigates and answers specific research questions as follows:

1. What is the employers' satisfaction level with entry-level engineers' skills?
2. What is the relationship between engineers' skills ability and employers' satisfaction?
3. What is the moderating effect of employers' impression on the relationship between engineers' skills and employers' satisfaction.

1.5 Research Objectives

Primarily, this research is to determine the skills that are utmost needed for engineering graduates' employability, by determining employers' satisfaction level with entry-level engineers' skills. The details of the objectives are as given below:

1. To determine employers' satisfaction level with entry level engineers' skills.

2. To identify the relationship between entry-level engineers' skills ability and employers' satisfaction.

3. To examine the moderating effect of employers' impression on the relationship between entry level engineers' skills and employers' satisfaction.

An empirical data regarding the satisfaction among the manufacturing employers with young engineering graduates is been aims to be provide from this study.

1.6 Significant of the Study

Aim of this research is to investigate employers' satisfaction regarding skills of entry-level engineers in Malaysia. This study examines the skills required for engineering graduates by employers in the industrial sector for them to be hired. This study also

determines the factors that affect the new graduates' employability, including the influence of skills on engineering graduates.

The findings of this study shall benefit scholars and educators regarding the graduates skills needed to be hired by Malaysia manufacturing industry. Theoretically, the outcome and contribution from this study may enhance and update the current literature on engineering graduates' employability. A literature search yields a scarcity of studies regarding issues of engineering graduates' employability from the perspective of employers in Malaysia. Lot of study and research has been done at the western country only which are different from the Malaysian environment (Sahandri, 2011).

The research determines the skill factors that have an impact and affect to the new engineering graduates employability from various angles and what employers demand from their new employees.

It also examines and determines if there are any differences in perception of employers with regards to the skills needed by the industrial community. The data obtained in this study predicts the important skills that employers look for before hiring employees. There are certain skills that are of top priority to employers before they decide to hire a graduate. Sometimes, the nature of the organization or industry itself determines the types of skills that are needed the most.

According to Rosenberg *et al.* (2012), for unprepared graduates, it will have a little chance to being successful for obtaining the employment and then being able to perform the job. Moreover, the perception of employers with regards to additional, relatively important to employability skills for employees need to have in order to be hired by the industry, is explored.

Most important thing is the study of factors to determine what employers actually want and need that will open up a new dimension to educational programs and present tremendous challenges to HEIs to emphasize on those skills that are necessary and parallel with the demand for higher-level skills in the labour market today. This is very important because the moulding of graduates in HEIs today will determine what kind of skills employees will be equipped with in the future. The big question is: What kind of skills are needed by industry players in future? Therefore, it was essential and important to implement this study to determine and predict future skills needed.

Therefore, this study hopefully contributes to employability and provides guidelines that may prove to be useful to those seeking to create or develop training, curricula or other related matters. This study can also contribute to the society, especially to new engineering graduates, in developing their own skills that are parallel with the needs and demands of employers in the labour market. Furthermore, the world labour market is evolving rapidly and employers have expressed concern with graduates not demonstrating adaptability and flexibility in order to cope with future employment needs (Alias, 2013).

HEIs or other professional institutes or policy makers to provide better-prepared workers to the labour market according to the needs and demands of industry players can use the data collected from this study. The findings can also be a source of reference in setting the curriculum for the subjects offered by the HEIs to suit the skills required in future. It can help to equip future workers with the necessary skills that can benefit both the industry and other organizations. In addition, this study closes the gap between shifts 2 and 4 for employability in the 10 shifts of the Ministry of Education (MOE) in the MEB.

Apart from that also, the findings from this study may effectively contribute to university and TVET management, especially on the method of enhancing the programs to meet the skills needed by industry players, thus , enabling the universities and government to determine and concentrate to the most important and critical factors in producing skilled workers in Malaysia. This is a broader contribution that will help the government initiatives under the Transformation National 50 Plan.

1.7 Scope of the Study

This study investigates the employers' satisfaction with engineering graduates' employability among manufacturing employers in Malaysia. The respondents for this research are the senior managers of companies obtained from the FMM Directory, 2015.

The utmost focus from this research are to analyse the satisfaction of manufacturing employers in Malaysia regarding skills of engineering graduates. Specifically, the study identifies whether or not the skills of engineers are align with the employers' demand, especially in the manufacturing sector. This study also determines the satisfaction of employers with the skills Malaysian engineering graduates have, so that the Malaysian government can plan the kind of skills to be focus on for Malaysia's future workers.

This study adapts the cross-sectional quantitative approach method with data been collected using the questionnaire distribution. The data were collected from industry players in Melaka, Pulau Pinang and Negeri Sembilan, involving 195 respondents. The results are based on their honesty and seriousness in answering all the questions given to them, and the willingness of the managers to be involved in the study.

1.8 Definition of Key Terms

This thesis focuses on employers' satisfaction with engineering graduates employability: A study among manufacturing employers in Malaysia. Certain terms are mentioned in this study, which are defined below:-

Employability

Employability relates to individuals' ability to be engaged and retained in his or her career. The higher the employability skills of an individual, the higher his/her

opportunities to be hired for a job and retain it (Hillage & Polland, 1998). Patrickson and Ranzijn (2003) asserted that employers view employability as an extra value been added to the skills possessed for a job candidate.

Employability refers to the ability to be employed (Waterman *et al.* 1994). Employability was an ability, skills to get or maintain a formal employment, or looking for others job, if needed (Hogan *et al.* (2013)

According to Harvey (1999), employability refers to ways in which graduates exhibit values that employers foresee are needed for their organization. Harvey (2012) added that it also means graduates' ability in acquiring a satisfying job.

Employer

Employer refers to an individual or a company that employs workers. The employer pays wages/salary to the employee in return for the performance of a job. Employers can be executive directors, directors, supervisors, human resources personnel, managers of employees' affairs or similar positions. They are responsible for reviewing applications, interviewing, recruiting and hiring workers for their company.

Skills

Skills are categorize under the following competencies: problem solving, personal values, relationship with others, decision-making skills, maturity, communications skills, job commitment and task-related skills. Usually, students must equip

themselves with skills that meet demands of various jobs upon graduation (Latisha & Surina, 2010).

Jackson (2009) mentioned skill is determined by its significance, performance level and any variations by organization types and geography. Furthermore, skills depend on evaluators' perception (Yuzainee *et al.* 2011). In other words, skill is a capacity to complete an explicit chore (DEST, 2006).

Robinson (2000) viewed skills as foundation needed to get and retain the job, as well as perform well on the chosen occupation. Several researchers have described skills as something that is able to be taught (Lorraine, 2007) and transferred (York, 2006).

According to Shaymalee (2013), skills are a small set of skills that are deduced from a large set of specific features; or skill can be illuminated through few explicit characteristics.

A skill was an ability to learn how to make the job done with pre-determined results at a given period of time and certain amount of effort, or both. In other words, skills are the abilities possessed by a person. Skills can belong to a general domain or to a specific skills domain. For example, some general skills domain in work include self-motivation, teamwork, time management, and leadership style. The specific skills could be for only certain jobs. Usually, certain situation will stimuli and environment are needed to assess the level of skill displayed and being used.

The ability of graduates to accomplish requirements from employers was skill, in terms of willingness or readiness to adapt and adopt to the new environment, and to know how to operate and use tools for work without guide from others. The most important thing is graduates a willing and need to be ready to learn new things easily, at the same time willing to change anytime in this competitive world.

Entry-Level Engineers

Engineers' entry-level from the employers' view refers to the readiness of work and offering of skills, inputs, attitude and comprehension which allow fresh graduates to contribute actively to organizational goals (Mason, Williams, & Crammer, 2006).

An entry-level job is often the initial career that a graduate enter after completing a training or an entry point to a selected career before graduates embark to other professional levels. Generally, at entry level, only basic skills and knowledge are required and such new employees generally have a low salary.

This means graduates must be equipped and ready with the necessary basic skills needed by the industry before the company can employ them. Preparations must be done when the graduate is still at the HEIs.

An engineer shall complete and finish a four-year education at college degree, work under the supervision of a professional engineer for a minimum of three years and

pass the Professional Assessment Examination (PAE) in order to certify as a professional engineer. In other words, engineers who have less than three years' experience after graduation from Malaysian HEIs, are entry-level engineers.

Sometimes, work experience in the field or profession is not required even though the graduates have to undergo the internship program at university level or some on-site training. Usually, it only requires a specific academic qualification from HEis for an entry-level job offer.

Zaharim *et al.* (2009) suggested that graduate engineers secure and show soft skills like communications, problem solving and interpersonal, for employment today and in the future.

Employer Impression

Employer Impression means how employees manage to impress the employer regarding the output from their job done that have been given by their employers from several of angle and show that they have try their best to make the job done perfectly.

Employer Satisfaction

The term used to describe either the employees a fulfilling the employers desires and need at work especially in term of skill and output of task.

1.9 Organization of the Study

The planning of this study have been arrange in 5 chapter. These chapters are summarized as follow:-

Chapter one has present the study background, research question, problem statement, objectives of the study, significance of the study, the study scope and definition of the key concepts.

Chapter two has literature review on Fundamental General Skills, Engineering Skills, teamwork Skills, Adaptive Skills, and Self-emotional Intelligence Skills which are the research variable and Employer Impression which are the Moderated. Moreover, chapter two present the issue of Employer Satisfaction among the entry level of Engineering Graduates from industry sector, and the gap from the literature.

Chapter three discuss the study research design, sampling design, population measurements, data collection process, pilot study, introduction to data screening and statistical measurements.

Chapter four discusses and presents in depth analyses for the outcome of the data that have been collected by employing the quantitative method. This chapter specifically highlights the demographics profile of the respondents, data screening, measurement

of validity and reliability, Explanatory Factor Analysis (EFA) and Multivariate analyses of the hypothesis testing.

Chapter five is the final chapter include in this write up study. It discuss in detail the result of various hypotheses in chapter two. This chapter present the theoretical and practical benefits of the present research, and limitation of the study.

CHAPTER2

LITERATURE REVIEW

2.1 Introduction

This study primarily aimed to investigate satisfaction with engineering graduates' employability among manufacturing employers in Malaysia. Previous studies have shown that skills are important and essential to the workplace and for employability. Therefore, this chapter elaborates on the engineering skills and employability and gives Malaysian education scenario overview.

2.2 What is engineering

Bianca and Peter (2004) asserted that engineering is a career focusing on the application of skills of an integrated knowledge in terms of science, mathematics and technology, blended with business and management, obtained through a particular discipline in engineering education and professional training.

Zaharim *et al.* (2009) said that engineering makes a speciality of producing, providing and sustaining eco device, service and products for community and industry. Therefore, engineers are those who have relevant skills to assist in the knowledge application and practice in the work environment. Engineering skills refer to the

capacity to execute related skills in engineering and information in order to be employed, retained and successful in the job, Zaharim *et al.* (2010).

Engineering is an occupation, which combines mathematical, natural sciences knowledge and judgment to improve techniques of utilizing substances, and coercion of nature economically for the gain of humankind (ABET, 2006).

Moreover, Sheppard (2006) mentioned that engineering work focuses on finding a solution for an undesirable condition using technology applications, and the technologies may be reputable, emerging or yet unimagined.

At the same time, engineering work is about problem solving and its effect on the world, for example, altering processes or procedures or introducing new products, technologies or knowledge. Engineers, unlike scientists, are responsible for being change agents (Sheppard, 2006).

Furthermore, from the researcher's view, engineering is the capability to accumulate in-intensity and particular engineering understanding and to utilize a system to design, operate and use technologies, such as computer technologies, machine and software and engineering tools. It also includes engineers' ability to learn, gain new knowledge in the engineering field and their willingness to upgrade themselves to be aligned with the evolving technologies.

2.3 Concept of Malaysian Engineer

Vision 2020 is the idea of Tun Dr Mahathir Mohamad, the fourth Prime Minister, announced during the Sixth Malaysia Plan on 28 February 1990. This 30-year plan is geared towards developing Malaysia into a modern country and calls for the nation to achieve self-sufficiency in all aspects of life as an industrialized nation. "The country of Malaysia is ready to be a advanced nation before the year 2020,"stated the then Prime Minister, Dato' Seri Najib Tun Razak, in viewing the nation's resilient economy with a recorded growth of 5.6% in 2012, due to robust investments and also good local consumption (The Star Online, 2013). The Malaysian government has a big role to play to boost the economy in all sectors, especially in the industrial sector, to make Malaysia a modern country. According to the former premier, Datuk Seri Najib Tun Razak, Malaysia is on track to becoming a developed nation by 2020 (The Star Online, 2014).

This is supported by a new record in investments in Malaysia amounting to RM 216.5 billion in 2013, and also in foreign and domestic direct investments that continue to increase (MIDA, 2014). The National Key Economic Areas (NKEAs) have attracted an impressive RM89.9 billion in total investments for the year (MIDA, 2014). According to MIDA (2014), these projects are expected to create 192,000 new high paying jobs for workers in Malaysia.

Malaysia's labour force comprised about 14.3 million people in 2014 and the unemployment rate was 3.1% in both 2013 and 2014. The data also shows that the major export products from January– December 2013 were Electrical and Electronics Products (Department of Statistics Malaysia, 2014). This means that Malaysia needs more engineering graduates to cater for the future.

According to a report by the Ministry of Human Resources (MOHR), as published by the Utusan Malaysia online on 12 November 2014, it was predicted that vacancies would be created for 115,000 professional workers in all sectors in five years' time to fulfil the demand for workers in this country. This means that Malaysia will need more skilled workers, especially engineers, in the coming years as it moves towards becoming a modernized country. This statement is supported by the then Prime Minister, who when launching the new road map plan (higher education) on 7 April 2015, mentioned that the government is expected to produce about 650,000 technical and vocational graduates by 2025.

Currently, fresh graduates face more challenges to be employed compared to previous graduates. Employers demand for engineers with competencies and capabilities besides excellent academic knowledge to face the stiff global competition (Mohamad, 2004). This statement clearly indicates that engineers must equip themselves accordingly before entering the work environment. Without proper preparation, engineers will not be capable to deal with the needs of the industry.

Munohsamy (2015) indicated that engineers must have the necessary skills to sustain in the working world and graduates who enter the working world with knowledge gained from HEIs per se cannot meet the demands of the industry.

2.4 Employment trend of Malaysian Engineers

The Institute of Labour Market Information & Analysis (ILMIA), mentions that the five top professions in Malaysia are electrical engineers, petroleum engineers, software engineers, accountants and actuarists (ILMIA, 2015). It is clear from the statement that three of the professions are in the engineering sector. This means that skilled engineering graduates are essential and are wanted by employers in Malaysia, and this demand will retain to growth within the future. In addition, according to the ILMIA (2015), the highest output of graduates from both private and public institutions by field of study was 33.7% for those with Business & Law and Social Science backgrounds. In 2014, the number of graduates from HEIs totalled 273,898 persons, of which 24.8% were employed as skilled workers, while 3.0% were unemployed in 2013 and 3.1% in 2014.

Luekitinan (2012) found that graduates with an engineering background prefer to work abroad, with Malaysia ranking as the second country of choice among eight other countries for graduate engineers. Some of the reasons for this attraction are the work experience that they hope to gain here as well as the life in general in Malaysia. These findings show that skilled professional graduates from abroad want to work in the

Malaysian industrial sector due to its demand for skilled engineers (Rahmah & Ragayah, 2003). These findings are supported by Amarjit Kaur (2014), who stated that even though initially, higher levies were imposed on skilled migrants, government recently has amended its ruling and at present a pathway to citizenship and permanent residence are offered instead.

Zaharim *et al.* (2009) found that the majority of the organizations that have employed graduates are satisfied with their skills and knowledge. Employers prefer new engineers with the essential and relevant skills and abilities needed for employability.

However, they also mentioned that these new programmes are still not considered as mainframe disciplines and are less regulated. Likewise, Poo *et al.* (2012) stated that skilled workers, such as engineers and technicians, are not so much in demand in the agricultural-based industries compared to the non-agricultural-based industries.

Local companies are showing a greater interest in hiring Malaysians with experience in overseas markets because of their global exposure and knowledge of the global business culture (Daily News, Talent Corp, 2015). In 2014, Sally Rajin, the manager of Robert Walters (RW) said, "To cater to the demand for quality Malaysian professional candidates in a limited candidate pool, organizations have to turn their attention to attracting talents from overseas bases to strengthen the local workforce".

Furthermore, Malaysian skilled workers prefer to work abroad because of the better environment, salary and infrastructure. Fadilah Puteh *et al.* (2012) explained that there is a dearth of Malaysian professional workers because many of them have decided to work abroad, especially in the professional and training fields, due to better salary, quality of life and working conditions.

The Malaysian government is trying to attract the Malaysian skilled workers abroad to serve in this country. The government has also developed 1,212 certificate centres to increase the professional workers to reduce the dependence on expatriate professionals (Star Online, 2015).

Sapaat *et al.* (2011) viewed graduates employability remains the top issue even though the number of graduates increases yearly. A tracer's study shows that 139,278 graduates were produced by HEIs in 2008 and this number increased to 155,278 graduates in 2009.

According to Bloom and Saeki (2012), employers require different professional skills subject to their economic sector, firm and the region. Moreover, employability skills merge education and career (Curtis & McKenzie, 2001).

The drop of human capital justifies the gap in finding qualified job candidates amid the high rate of unemployment (Hogan, Premuzic, & Kaiser, 2013). In addition, there are gaps between academic research on occupational performance and the actual hiring

process. On the other hand, the substantial amount of literature that is available demonstrates how certain essential psychological factors, including cognitive abilities and personality, can predict work performance (Hogan, Premuzic, & Kaiser, 2013).

According to DEST (2002), Australia, United States of America (USA), Japan, United Kingdom (UK), and the European Union, defined the framework criteria for engineers' employability skills identified by the employers and industry. Table 2.1 below by Zaharim *et al.* (2010) gives the criteria about the engineering employable skills that have become a framework of reference for Malaysia. This Engineering Employability Skill Framework is being used as a guideline by technical employers when seeking to recruit employees among graduates of engineering.

Table 2.1
International Engineering Skills / Attributes Required for Engineering Graduates

USA	*UK*	*AUS*	*JAPAN*	*EU*
ABET Engineering Criteria 2000	***OSC Engineering Occupational Standards***	***Engineers' Attributes***	***Employable personal qualities***	***Generic Employability Skills***
Ability to apply knowledge of mathematics, science and engineering.	Engineering products development.	Ability to communicate effectively with the engineering team and also with the community at large.	**Personal Skills** 1) Com munications Skill 2) Personal presentation skills 3) IT and computer skills 4) Problem solving skills 5) Leadership skills 6) Visioning skills 7) Goal setting skills 8) Self-assessment skills	**Mastery of one's native language** Including basics of spelling and sentence structure.
Ability to communicate effectively.	Own development of engineering competence.	Ability to function effectively as an individual in multidisciplinary and also multicultural teams, as a team leader/manager as well as an effective team member.	**Attitudes** 1) Responsible 2) Optimistic 3) Curious 4) Ambitious 5) Desire for challenge 6) Cooperative 7) Vitality	**Critical thinking** Ability to think through a problem/situation and to distinguish between the facts and the prejudices.
Ability to design a component, system or process to meet desired needs.	Improve the quality and safety of engineering products and processes.	Ability to manage information and documentation.		**Understanding about the basics of maths and science** Particularly to cope with new technology.

Table 2.1 (continued)

USA	*UK*	*AUS*	*JAPAN*	*EU*
ABET Engineering Criteria 2000	***OSC Engineering Occupational Standards***	***Engineers Attributes***	***Employable personal qualities***	***Generic Employability Skills***
Ability to design and conduct experiments as well as to analyse and interpret the data.	Installation of engineering products.	Capacity for creativity and innovation.	**Traits** 1) Initiative 2) Sensitivity 3) Flexibility 4) Individuality 5) Sincerity 6) Creativity 7) A balanced personality 8) An entrepreneurial mind	**Learning techniques** Ability to adapt to new situations.
Ability to the function in multidisciplinary teams.	Maintenance of engineering products	Capacity for life-long learning and professional development.		**Team spirit** Ability to work in a group
Ability to identify, formulate and solve engineering problems.	Plan and manage engineering projects	Professional attitude.		**Personal discipline** Sense of responsibility
Ability to use skills, techniques and modern engineering tools that are necessary for the engineering practice.	Produce engineering products	Understand professional and ethical responsibilities and is committed to them		**Decision making** Sense of commitment and willingness to take risks.

Table 2.1(Continued)

USA	*UK*	*AUS*	*JAPAN*	*EU*
ABET Engineering Criteria 2000	*OSC Engineering Occupational Standards*	*Engineers Attributes*	*Employable personal qualities*	*Generic Employability Skills*
Knowledge of Contemporary issues.				**Initiative** Creativity and sense of curiosity.
Recognition of the need for and the ability to engage in lifelong learning.				**Professionalism** Determination to achieve excellence and to gain a competitive edge.
Broad education necessary to understand the impact of engineering solutions in the societal/global context.				**Civic mindedness** Sense of service to the community.
Understanding of professional and ethical responsibilities.				

Source: Practical Framework of Employability Skills for Engineering Graduates in Malaysia (Zaharim *et al.* 2010)

Table 2.1 shows that each country above has its own definition regarding the criteria for engineering employability. One can conclude that the countries mentioned in this Table view the skills needed seriously. The Malaysian industry also uses this as a guideline to seek engineering graduates (Zaharim *et al.* 2010) from other countries. This framework explains how employability skills are specific according to the needs of the jobs in different industries.

Furthermore, the Employability Skills Framework provides 13 essential soft skills to be possessed by graduates of engineering (Hasan *et al.*, 2007). These skills are based on the expert skills criteria from the Accreditations Engineering Programs as approved by ABET, as summarized in Table 2.2 below:

Table 2.2

Employability Skills Framework

No	Skills	Description
1.	Communicate effectively	The ability to present ideas with confidence and effectively through aural, oral and written modes, not only with engineers but also with the community at large.
2.	Competent in application and practice	The ability to use the techniques, skills and modern engineering tools.
3.	Interpersonal or teamwork skills	The ability to function effectively as an individual and in a group with the capacity to be the leader or manager as well as an effective team member.
4.	Engineering problem solving and decision-making skills	The ability to undertake problem identification, apply problem solving, formulation and solution.
5.	Apply knowledge of science and engineering principles	The ability to acquire and apply knowledge of engineering principles
6.	Competent in a specific engineering discipline	The ability to acquire in-depth technical competence in a specific engineering discipline.

Table 2.2 (Continued)

No	Skills	Description
7.	Understand professional, social and ethical responsibilities	The ability to understand the social, cultural, global, ethical and environmental responsibilities of a professional.
8.	Lifelong learning	The ability to recognize the need to undertake lifelong learning, and possessing/acquiring the capacity to do so.
9.	Engineering systems approach	The ability to utilize a systems approach to design and evaluate operational performance.
10.	Design and conduct experiments	The ability to design and conduct experiments, as well as to analyse and interpret data.
11.	Knowledge of contemporary issues	The ability to continue learning independently in the acquisition of new knowledge, skills and technologies. Nowadays, the use of information, communication and computing technologies is very essential in the knowledge-based area.
12.	Competency in theory and research	Having the competency in theoretical and research engineering.
13.	Entrepreneurial skills	Having basic entrepreneurial skills.

Source : The Future of Engineering Education in Malaysia (2007), EAC Manual (2003), ABET, USA (2009)

Table 2.2 summarizes the important skills demanded and expected by employers in Malaysia (Hassan *et al.* 2007). This Table shows that generic capabilities or skills are crucial for engineering graduates to be employed. That means as engineers, they have to continuously update and improve their engineering skills and the knowledge in line

with the changes in the environment and technologies over time. Engineers also need to prepare themselves to adapt and adopt to the skills demanded and not be left behind.

2.5 Skills needed by the Malaysian Industry

Gurvinder Kaur and Sharan Kaur (2008) found that employers want graduates these days to be already fully equipped with Information and Communications Technologies (ICT) knowledge and abilities (skills) which are wished, such as Microsoft Office, the Internet and the use of emails. They also explained that currently, team skills are still lacking, and most companies require that their employees can work in groups or teams. From this study, it is clear that the capability to work in a group (team) was an added value that is essential and sought by industry. This means that teamwork skills are vital for graduate employability and it is a factor to be considered by industry when employing graduates.

Yuzainee *et al.* (2010) said that the criteria for employability that are sought by most employers are decision-making, skills for problem solving, skills of communication, lifelong learning, teamwork, professionalism and knowledge of engineering principles and science. They explained that graduates do not only need to acquire good academic results, but must also have a positive attitude towards the job. Both the studies by Gurvinder Kaur and Sharan Kaur (2008) and Yuzainee *et al.* (2010) show that the importance of teamwork and communication skills should be emphasized for

graduates seeking employment, and that further studies also need to be carried out, especially about teamwork.

Rahmah and Ragayah (2003) analysed types of skills possessed in the Malaysian manufacturing sector by conducting a survey in 1999 on 2,065 workers in six different industries. They discovered that education is significant in ascertaining the difference of salary in particular between skilled and semi-skilled employees and also between semi-skilled and unskilled ones. They explained that skilled workers would receive the highest earnings for their job. It is clear that skilled graduates will have a good opportunity to earn a high salary if they are equipped and prepared with the skills/abilities needed by the industry.

According to Poo *et al.* (2012), the nation needs to increase its availability of skilled and knowledgeable workers in major categories. The present mismatch between the supply and demand of a skilled workforce needs to be solved. This is because the employment growth rate is faster compared to the labour required, especially in the highly skilled categories. This is supported by Sangho and Mazlina (2009), who found from their study that the quality and skills of employees are the most essential determinants of technical efficiency. This means it is important to develop and produce highly skilled engineers according to industry needs and demands.

Furthermore, in determining new employees' skills, there are certainly some specific technical skills that are required in any given job (Shoenfelt, Stone, & Kottke, 2013).

Employability for a fresh graduate student is not only confined to knowledge and technological/technical skills, but also other skills/attributes and attitude (for example, behavioural attribute) (Jain & Jain, 2013).

Moreover, employability is critical in sustaining competitive advantage for individual and firm, leading to career success (Heijde, 2006). To find new employees as needed or to retain the current employees is defined as employability (Hogan, Premuzic, & Kaiser, 2013). Therefore, it is necessary to investigate various predictors that affect individual's ability in acquiring traits to be hired (McQuaid & Lindsay, 2005). Studies have been conducted to identify the employability factor. However, a gap exists between employability and the kind of technical skills that candidates must have.

In addition, National Graduate Blueprint (2012) found graduate employability's lack of specifications in terms of soft skills approach. Besides, the enrolled courses mismatch is also a primary factor that has a negative impact on employability rate.

Furthermore, employers in Asian countries or Malaysia are in a dilemma when it comes to discussions on the problem of graduate employability (National Graduate Blueprint, 2012). The Manpower Inc. Survey in 2008 identified the most difficult attributes being sought by Malaysian companies are the ability to relay information to others, strong communication skills, ensuring that customers or clients are satisfied with every contact, a highly consistent commitment and standards of integrity, service quality, ability to work independently, honesty and ethical conduct, and self-motivation.

Downe & Ho (2008, cited in the National Graduate Blueprint, 2012) found it hard to find loyalty, commitment, ability to reason, problem solving, critical thinking and communication skills, self-motivation, high standard consistency and quality of service commitment, independence and also the message relay ability to others These are the factors that need to be investigated further. It is essential to acknowledge specific skills required by employers in order to gather information and suggest ways to hinder shortage of skills faced by industry players, particularly in the technical fields.

Basri *et al.* (2012) pointed out that in 2010, 10 out of 13 attributesreceived high scores from employers, who were satisfied with the graduates' performance compared to the data that was obtained from their study in 2006. In 2010, they discovered that satisfaction of the employers' regarding the graduates' performance in communicating effectively with the fellow workers and community, and this attribute received the highest score of 67%. In 2006, they found that this attribute only received a score of 49.5% from employers. The potential to utilize a system approach to evaluate and design operations; function as an team member effectively and as an individual and to act as a leader or manager; and possess knowledge on current issues are the attributes that score low points for employers' satisfaction in 2010 compared to 2006.

Therefore, skills are very important for ensuring the productivity and output of the company. Without the proper skills, employers will face problems in dealing with

work and the workers in the company. Solomon *et al.* (2008) explained that most companies in Malaysia are facing problems with lack of customers and communication, less training and inappropriate skills, less responsibility, a non-stable workforce and poor allocation of time and resources. Generally, this shows that Malaysia is still lacking in skilled persons that graduates still cannot be integrated properly with a readiness to work, and who are been polish with the skills needed.

Furthermore, according to Fadilah *et al.* (2012), Malaysia is facing a problem where there are about 700,000 Malaysian people living and working abroad and most of these people are skilled professional workers. The large and diverse Malaysian community abroad represents a valuable asset that requires attention and which is needed to spur Malaysia towards a high income economy. Furthermore, as mentioned by Soon and Quek (2013), in order to have a status of a developed nation by 2020, Malaysia will need more than 200,000 engineers. They also explained that there are 75,000 registered engineers in this country; however, according to Board of Engineers Malaysia (BEM), 10,000 engineers are needed per year to realize this goal.

The government of Malaysian launched the National Graduate Employability Blueprint, 2012 – 2017 of the Ministry of Higher Education, (MOHE) on 22 February 2013, as an important guide for HEI leaders, policy administrators and program leaders to acknowledge graduate employability (GE) elements and begin the necessary road map and planning measurements to enhance the GE programs and activities among the institutions.

In addition, the MEB was launched by the then Prime Minister on 7 April 2015 as a guide for HEIs to mould graduates for a modernized Malaysia beyond 2020. As shifts, 2 and 4 are related to this study, it aims to find ways to close the gaps in GE and to achieve the objectives of the policy accordingly.

2.6 Engineering Skills of Workers

A report outlines employers' perception regarding the competency of graduates, clearly implies that there is an urgent need to improve and enhance engineering programs in all areas and fields, specifically in certain non-technical factors that are specific to engineering education (Future Of Engineering Education in Malaysia, 2006).

Furthermore, according to Curtis and McKenzie, (2001), the employability skills concept merges work and education. Many countries, for example, Canada, the UK, Australia, the USA, have designed their own modules for the competency needs and desires in the labour market. In the USA, the project is called the Secretary's Commission on Achieving Necessary Skills (SCANS); in Canada, it is known as Employability Skills, in the UK, it is called the National Council for Vocational Qualification (NCVQ), and in Australia, it is called the Mayer Key Competencies (Curtis & McKenzie, 2001).

Skilled workers are important, especially in the manufacturing industry. The shortage of skilled workers has an impact on employers, especially when it comes to getting and hiring workers with certain requisite skills. Kalafsky (2008) conducted a study at Charlotte, North Carolina regarding the shortage of employee at manufacturing sector and found that many companies are facing a serious shortage of skilled labour, especially in the high-end positions. Most of the firms were located in places with the highest level of job losses in the manufacturing sector, and many firms saw the labour shortage as a salient competitive concern.

In addition, the data at the end of this study indicates that manufacturers agree that HEIs play an essential role as a source of training and recruitment. In addition, Kalafsky (2008) mentioned that a group of firms viewed the shortage of workers as an essential issue, and this group tended to comprise those firms that were finding it difficult to retain their skilled employees and were locked in rivalry with other companies for the potential workers.

The issue of the shortage of skilled graduates remains unsolved and it should not be happening today due to the higher demand from industry players. Bloom and Saeki (2012) explained that the shortage of skills is still a major barrier to the continuous development of the Indian economy. They also found and confirmed that there is widespread dissatisfaction among firms with the current graduates. After analysing the factors and classifying the skills, they concluded the core employability skills, and most essential in the eyes of employers are soft skills and communication skills.

They suggested that institutions of engineering education must expand the graduates' skills - set, especially soft skills. They must re-focus on the assessment, learning and teaching processes and the curricula from the lower order thinking skills, for example, encouraging creativity, analysing and solving engineering problems and also interacting more with their subordinates in order to comprehend the required skills needed in that sector and region.

In addition, Bloom and Saeki (2012) concluded from their research that they did not have a particular explanation as to why the core employability skills of reliability and self-motivation remained the factors with the largest skills gap.

Furthermore, the accelerated changes in today's global economies mean that graduates have to be prepared for a high level of competition, not just at the local level, but at the regional and global levels as well. Moreover, globally are facing with the decline of skilled and employable taskforce (Iyer & Dave, 2015). Employers are now looking for a worker paradigm that can be part of the skills employability or have employability skills (Taylor, 2005).

On that basis, employability can be planted early on and continued as a life-long learning process for improvement. Yet, the growing number of changes that are taking place at an increasingly rapid pace are undermining the strategies and plans of organizations, including the potential of organizations to be flexible in anticipating

changes. Furthermore, employability will enable employees to adjust to demanding job requirements (Heijde, 2006). Therefore, in a highly competitive industrial world, graduates who has less skills for employability will have difficulty in rival with others locally and globally (Al-Alawneh, 2014).

Employability skills include those related to personality, social behaviour and daily life routine as identified by employers (Al-Alawneh, 2014). These are important for young entry-level employees to be successful in the workplace. These are life skills that must be taught and learned as rigorously as the fundamental skills (Al-Alawneh, 2014). The enhancement of the workers' employability will increase the value of the employees, not only in the eyes of the firm that they are working in, but also in the external labour market (Grip, Loo, & Sanders, 2004).

Furthermore, courses on employability skills and life skills are vital for youth at all levels of study, to prepare them for job opportunities and to help them chart their career path upon graduation (Al-Alawneh, 2014).

Many players in the industrialized economies are expecting a shortage of young employees; this implies that employers will be under pressure to retain their personnel longer (Grip, Loo & Sanders, 2004). Numerous reports currently show that more than half of the individuals who are holding undergraduate degrees are underemployed or are hired with jobs that not related in any way of their learning or training (Harms & Brummel, 2013).

Additionally, the development of a future workforce depends on the current students' mastery of the competencies that are needed in the workplace (Al-Alawneh, 2014). While some industrial representatives are contented with the graduates 'skills, there are also employers who feel that graduates skills are still underdeveloped. Some of them also believe that HEIs have provided the graduates with a strong academic knowledge foundation but not with the strength and ability to apply that knowledge intelligently at the workplace setting (DEST, 2007).

Munohsamy (2015) did a review of the literature concerning the employability skills that are needed in engineering graduates. In this review, she came up with a comparison of the GE skills that are needed and required by various firms by year. Table 2.3, adapted from Munohsamy (2015), illustrates the summary of skills needed in the engineering sector by employers from 2003 to 2013.

Table 2.3:

Summary of the Employability Skills Required by the Employers from Engineering Graduates.

No	Year of the research	Specific & general Employability Skills Required by the Employers
I.	2003	Project management skill, Interpersonal communication, Project planning/scheduling, People management, Problem solving & Team management.
2.	2004	Employability
3.	2005	Non-verbal interpersonal skills, Verbal presentation skills, Written interpersonal skills, Effective communication & Teamwork.

Table 2.3 (continued)

No	Year of the research	Specific & general Employability Skills Required by the Employers
4.	2006	Technical communication skill
5.	2007	Oral and written communication skills, Communicating effectively, Competent in application and practice, Interpersonal or team work skills, Engineering problem solving and decision-making skills, Applying knowledge of science and engineering discipline, Understand professional, social and ethical responsibilities, Lifelong learning, Engineering systems approach & knowledge of competencies
6.	2008	Communication, Creative thinking and problem solving, information management, Leadership and organization, Group effectiveness and teamwork, Work-related disposition and attitude, Personal traits and self-management.
7.	2009	Communication skills, Thinking skills, Sources skills, Resources skills, System and technology skills & Personal qualities.
8.	2010	Critical thinking, Problem solving skills & Team work.
9.	2011	Communication skills, English language, Writing skills, Thinking skills, Decision-making & problem solving, ICT skills, Teamwork, Work Planning, Value & Ethics, Self-confidence, Leadership, Personality, Intelligence & public knowledge.
10.	2012	Communication skills, Teamwork, Lifelong learning, Professionalism, Problem solving and decision-making skills, Competency, Knowledge of science and engineering principles, knowledge of contemporary issues, Engineering systems approach and Competent in specific engineering discipline, Academic (Academic performance, college and job experience), Personal management (positive attitude, responsibility, and adaptability), Connectivity (Communication, information technology, teamwork and commercial awareness) & Exploration skills (Imaginative, innovative and creative).

Table 2.3 (continued)

No	Year of the research	Specific & general Employability Skills Required by the Employers
11	2013	Cooperating with others, Working in a team, Honesty, Follow instructions given & interact with others.

Source: Malaysian Employers' Perspective on Engineering Graduates' Employability Skills: Evidence from 10 years of study (Munohsamy, T., 2015).

Table 2.3 shows there are several engineering skills demanded and expected from Malaysian engineering organizations of engineering graduates. 11 skills are recurring either annually or bi-annually. Hence, Munohsamy (2015) concluded there are 11 skills required by the Malaysia engineering firms : problem solving skills, teamwork, application of theories, communications skills, interpersonal skills, lifelong learning, decision-making, skills of leadership, skills of thinking, ICT skills, and skills of management. Prediction of skills needed can be made from the type, demands and environment of the industry.

Zaharim *et. al.* (2009) found that employers are fairly satisfied with the graduates' knowledge on contemporary issues and entrepreneurial skills. Hence, employers are still searching out engineers who're ready with current knowledge and entrepreneurship abilities.

Studies have shown that skill is crucial for employability. Kalafsky's (2008) study at Charlotte, North Carolina, has found that majority of the employers are concerned with

the shortage of skilled labour. He also found that it is difficult to retain skilled workers as they are locked in competition with other firms. At the same time, having the right skills means job readiness (Latisha & Surina 2010) or the skills acquired to retain a job. Saterfiel & McLarty, (1995) asserted that job readiness refers to the foundation skills preparation for specific skills, i.e, preparing a sales report.

Other studies found that the ability to manage resources and communications, interpersonal, teamwork and problem solving skills comprise career and employability skills (Zinser, 2003). Personal characteristics, a set of accomplishments, and comprehension that allow individual to be succeed in job and their career (ESECT, 2004).

Ng (2009) studied employers' feedback on employability skills and found that employers are not satisfied with GE skills. This study involving 327 polytechnic students and 107 employers from the manufacturing industry. Mohamad Sattar (2010) found employers' satisfaction to be at a moderate level.

For this study, a matrix table was developed to portray more clearly the significant skills according to the theoretical framework. The matrix data was collected from literature related to this study as shown in Table 2.4.

Table 2.4

Skills matrix from related literature

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional Intelligence Skills	
1.	Ismail, N.A. (2011)	Graduates' Characteristics and Unemployment: A Study Among Malaysian Graduates	x	x	x	x		x	
2.	Hamzah, M.S.G. (2012)	The Scenario From an Employer's Perspective: Employability Profiles of Graduates	x	x	x	x	x	x	
3.	Bloom & Saeki (2012)	Employability and Skills-Sets of Newly Graduated Engineers in India: A Study.	x	x	x	x		x	
4.	Yuzainee et al. (2012)	Employability Skills Performance Scores for Fresh Engineering Graduates in Malaysian Industries	x	x	x	x		x	
5.	Muhammad K. Al-Alawneh (2014)	Measuring Students' Employability Skills as they are Perceived at Yarmouk University	x	x	x	x		x	
6.	Lee Harvey (2010)	Employability and Diversity.	x			x	x	x	
7.	Collin, K. (2004)	The Role of Experience in Work and Learning Among Design Engineers	x		x	x	x	x	
8.	Keenan, A. & Newton, J. (1986)	Work Aspiration, an Experience of Young Graduate Engineers			x		x	x	

Table 2.4 (continued)

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional intelligence Skills	
9.	Vassos, T.D. & Smith, D. W. (2001)	Environmental Engineering Registration in Canada – The Expectations of the Professional Engineer Working in this Field	x		x		x	x	
10.	Luekitinan, W. (2014)	Employability and Job Mobility: Critical Skills for New Graduates in ASEAN	x	x	x			x	
11.	Gurvinder, K.G.S. & Sharan, K.G.S. (2008)	Malaysian Graduates' Employability Skills	x			x			
12.	Claudia M. Van Der Heijden & Beatrice I.J.M. Van Der Heijden (2006)	A Competence-based and Multidimensional Operationalization and Measurement of Employability	x	x	x		x	x	
13.	Azami Zaharim et al. (2011)	Evaluating the Soft Skills Performed by Applicants of Malaysian Engineers	x	x	x	x			
14.	Swift et al. (2013)	Skills that Matter: The Reality and Importance of Learning on the Job	x	x	x	x		x	
15.	Soon, T. K. & Quek, A. H. (2013)	Engineering Education in Malaysia – Meeting the Needs of a Rapidly Emerging Economy and Globalization	x	x	x				x
16.	Azami et al. (2009)	Perceptions and Expectation Toward Engineering Graduates by Employers: A Malaysian Study Case	x	x	x	x	x	x	
17.	H. Basri et al. (2012)	Performance of Engineering Graduates as Perceived by Employers: Past and Present.	x	x	x	x			
18.	Kim, S. & Shafi, M. (2009)	Factor Determinants of Total Factor Productivity Growth in Malaysian Manufacturing Industries: A Decomposition	x	x	x	x		x	

Table 2.4 (continued)

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional Intelligence Skills	
19.	Solemon, B. et al. (2008)	Requirements engineering problem in 63 software companies in Malaysia	x	x	x	x	x	x	
20.	M.Y. Yuzainee et al. (2010)	Employability Skills for an Entry Level Engineer as Seen by Malaysian Employers	x	x	x	x			
21.	Spinks, N. et al. (2007)	Making It All Work: The Engineering Graduate of the Future, a UK perspective.	x	x	x	x		x	
22.	V.K. Gokuladas (2011)	Predictors of Employability of Engineering Graduates in Campus Recruitment Drives of Indian Software Services Companies	x	x	x	x		x	
23.	Kalafsky, R. (2008)	Workforce Shortage in the Manufacturing Sector	x	x	x	x	x	x	
24.	Rao, A. A. et al.(2011)	Emplcyability in MNCs: Challenge for Graduates	x	x	x	x			
25.	Warraich, N. F. & Ameen K. (2010)	Employability Skills of LIS Graduates in Pakistan: Needs and Expectations	x	x	x	x		x	
26.	V.K. Gokuladas (2010)	Technical and Non-Technical Education and the Employability of Engineering Graduates: An Indian Case Study	x	x	x	x			
27.	Nordin, R. (2013)	Technical Communication Skills Among Recent Electrical and Electronics Engineering Graduates in Job Industries	x	x	x	x	x	x	
28.	Markers, I. (2006)	A Review of Literature on Employability Skill Needs in Engineering	x	x	x	x		x	
39.	Cai, Y. (2013)	Graduate Employability: A Conceptual Framework for Understanding the Employer's Perception	x		x	x			
30.	McQuaid, R. W. & Lindsay, C. (2005)	The Concept of Employability	x	x	x	x		x	
31.	Sahni, L. (2011)	The Impact of Soft Skill Training Induction Programme on New Entrants	x	x	x	x			

Table 2.4 (continued)

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional Intelligence Skills	
32.	O'Meara, R. & Carmichael, M. (2004)	Recruitment Strategies for Industrial Technology Programs	x	x	x	x	x	x	
33.	Misra, R. K. & Mishra, P. (2011)	Employability Skills: The Conceptual Framework & Scale Development	x		x	x		x	
34.	Grip, A. D. Loo, J. V. & Sanders, J. (2004)	The Industry Employability Index: Taking Account of Supply and Demand Characteristics	x	x	x	x	x	x	
35.	Catherine Truss et al. (2013)	Employee Engagement, Organizational Performance and Individual Well-being: Exploring the Evidence, Developing the Theory				x	x	x	
36.	Jackson, D. (2009)	An International Profile of Industry-Relevant Competencies and Skills Gap in Modern Graduates	x		x	x	x	x	x
37.	Alan Felsted et al. (2010)	Employee Involvement, the Quality of Training and the Learning Environment: An Individual Level Analysis	x		x	x		x	
38.	Aida Hajro (2015)	Cultural Influences and the Mediating Role of Socio-Cultural Integration Processes on the Performance of Cross-Border Mergers and Acquisitions	x		x	x	x	x	
39.	Kachchaf, R., Ko, L. Hodari, A. Ong, M. (2015)	Career - Life Balance for Women of Colour : Experiences in Science and Engineering Academia	x		x			x	
40.	Steel, R. Landon, T. (2010)	Internal Employment Opportunity and External Employment Opportunity: Independent or Interactive Retention Effects?			x	x		x	
41.	Secker, J. Margrove, K. (2014)	Employment Support Workers' Experiences of Motivational Interviewing: Results From An Exploratory Study	x		x		x	x	
42.	Ali, A. A., Ryan, A.M., Lyons, B. J., Ehrart, M. G. & Wessel, J. l. (2015)	The Long Road to Employment: Incivility Experienced by Job Seekers			x		x	x	

Table 2.4 (continued)

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional Intelligence Skills	
43.	Corbiere, M. et al. (2014)	Work Accommodations and Natural Supports for Maintaining Employment			x	x		x	
44.	Koch, A, J. D'Mello, S. D. Sacket, P. R. (2015)	A Meta-Analysis of Gender Stereotypes and Bias in Experimental Simulations of Employment Decision Making.			x		x	x	
45.	Zhan, Y. Wang, M. Shi, J. (2015)	Retirees' Motivational Orientation and Bridge Employment: Testing the Moderating Role of Gender			x		x	x	
46.	Caruana, E. Cotton, S. Kiilackey, E. (2015)	The Relationship Between Cognition, Job Complexity and Employment Duration in First Episode Psychosis	x		x	x	x	x	
47.	Hielscher, E. Waghorn, G. (2015)	Managing Disclosure of Personal Information: An Opportunity to Enhance Supported Employment			x		x	x	
48.	Paadi, K. (2014)	Perceptions on Employability Skills Necessary to Enhance Human Resource Management Graduates' Prospects of Securing a Relevant Place in the Labour Market	x	x	x	x	x	x	
49.	Fugate, M. Kinicki, A. J., Ashforth, B.E. (2004)	Employability: A Psycho-Social Construct, Its Dimensions and Applications	x		x	x	x	x	
50.	Ridzwan, C. R. Yasin, R. M (2014)	Cultivating Learning : A Grounded Theory of Skills Acquisition for Vocation in Modern Apprenticeships	x	x	x	x		x	
51.	Schueke, M. J. et. al. (2009)	Relating Indices of Knowledge Structure Coherence and Accuracy to Skill-Based Performance: Is There Utility in Using a Combination of Indices?	x		x	x		x	
52.	Paxton, J. (2012)	Work in Progress : An International engineering certificate : Incentivizing engineering students to pursue global experiences					x	x	x
53.	Thurasamy et al. (2012)	An analysis of career advancement among engineers in manufacturing organizations.	x	x		x	x	x	

Table 2.4 (continued)

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional Intelligence Skills	
54.	Yoerger, M. et al., (2015)	Participate or else : the effect of participant in decision making in meetings on employee engagement	x	x	x	x	x		
55.	Bolino, M. C., Kacmar, K. M., Turnley, W. H., Gilstrap, J. B. (2008)	A multi-level Review of Impression Management Motives and Behaviours							x
56.	Cuyper, N. D., Witte, H. D. (2010)	Temporary Employment and perceived Employability : Mediation by Impression Management							x
57.	Wayne, S. J., Ferris, G. R. (1990)	Influence Tactics, Affect and Exchange Quality in Supervisor-subordinate Interactions: A laboratory Experiment and Field Study.							x
58.	Bolino, M. C., Varela, J. A., Bande, B., Turnley, W. H. (2006)	The Impact of Impression management tactics on supervisor's ratings of organizational citizenship behaviour.							x
59.	Bolino, M. C., Turnley, W.H. (1999)	Measuring Impression Management in Organizations: A scale Development Based on the Jones and Pittman Taxonomy.							x
60.	Bolino, M. C., Long, D., Turnley, W. H. (2016)	Impression Management in Organizations: Critical Questions, Answers and Areas for Future Research.							x
61.	Bolino, M. C. (1999)	Citizenship and Impression Management: Good Soldiers or Good Actors?							x

Table 2.4 (continued)

No.	Graduate Employability		Skills Ability						Employer Impression
	Author	Journal Title	Fundamental General Skills	Engineering Skills	Teamwork Skills	Specific Personal Skills	Adaptive Skills	Self-emotional Intelligence Skills	
62.	Viswesvaran, C., Ones, D. S., Hough, L. M (2001)	Do Impression Management Scales in Personality Inventories Predict Managerial Job Performance Ratings?							x
63.	Rao, A. Schimdt, S. M., Murray, H. (1995)	Upward Impression Management: Goals, Influences, Strategies and Consequences.							x
64.	Wayne, S. J., Green, S. A. (1993)	The Effects of Leader-Member Exchange on Employee Citizenship and Impression Management Behaviour.							x
65.	Yun, S., Takeuchi, R. (2007)	Employee Self-Enhancement Motives and Job Performance Behaviours: Investigating the Moderating Effects of Employee Role Ambiguity and Managerial Perceptions of Employee Commitment.							x
66.	Leary, M R., Kowalski, R. M. (1990)	Impression Management : A Literature Review and Two Component Model							x
67.	Peck, J., Levashina, J. (2017)	Impression Management and Interview and Job Performance Ratings: A Meta-Analysis of Research Design with Tactics in Mind.							x
68.	Gardner, W.L, Martinko, M. J. (1998)	Impression Management Organizations.							x
69.	Higgins, C. A., Judge, T. A., Ferris, G. R. (2003)	Influence tactics and work outcomes: A meta-Analysis.							x
70.	Rothwell, A., Arnorld, J. (2004)	Self- perceived employability Development and validation of a scale.							x
71.	Chen, Y. Y., Fang, W. (2008)	The moderating Effect of Impression Management on the Organizational-Politics Performance Relationship.							x

Table 2.4 is related to the development of variables for this study. This matrix shows the relationship among the variables for developing the theoretical framework for this study according to the objectives of this study. From Table 2.4, seven variables are determined for this study for further investigation.

2.7 Relationship between Variables

From Table 2.4 above, this study examines the following variable related to this research as below:

2.7.1 Employers' Satisfaction

A dependent variable for this thesis is employers' satisfaction. It looks into the satisfaction of the company with engineers who have been trained at the HEIs and whether or not they are equipped with the necessary skills the company needs, even though the required skills may differ from one engineering discipline to another and are decided by the nature of the work involved in each discipline (Shaymalee, 2013).

Apart from this, the dependent variable looks into whether or not employers are satisfied with the engineer's skills and if they are suitable to the industry and future planning (Husain, 2010).

Furthermore, a study analysed the graduates' and employers views regarding employment skills required inside the job marketplace and the existing skills possessed, and found that employers tend to employ public universities' graduates, (Gurvinder & Sharan, 2008). The industry assumes that engineering graduates from public HEIs have the relevant skills.

Zaharim *et al.* (2009) mentioned that the majority of industry are contented with the graduates' knowledge and skills; however, for employability, employers usually expect engineers has been ready and equipped with essential and relevant skills. The difference is only the skills needed and the nature of the industry. In general, employers are satisfied with their engineering workforce; however, they are dissatisfied with the entrepreneurial skills of their engineering workforce (Omar *et al.* 2006).

2.7.2 Fundamental general skills

Basic skills, such as reading, writing, calculating and communicating, are provided by schools. Other skills needed in today's work environment include the skill to operate basic computer applications, such as interpreting graphs, excel, Power Point presentation and word; also how to gather and manage information and use information technology.

Back *et al.* (1998) found that for successful engineering practice, organizational and management are essential skills, and practitioners sturdily stress that sound analytical and technical skills must be possessed by entry-level engineers to realize career expectations.

Nguyen (1998) mentioned loyalty and honesty, problem solving capacity, comprehension of the engineer's role in society and fluency of written mode in other

language (academic view), logic of thinking, commitment of work are the skills and attributes required.

2.7.3 Engineering skills

An engineer is a craftsman who has been trained with the required skills and techniques in relation to a specific field of engineering and possesses a practical understanding and fundamental knowledge about engineering concepts. Engineering often aids the engineer and technologists in projects, research and development. Engineering work involves the solving of technical problems. Engineers design, set up or build tools, conduct experiments and collect the data needed to calculate results. They also might make a model for new equipment. In manufacturing, the engineer helps to design and develop products. There are multiple fields in engineering, such as software design, technical drawing or engineering drawing.

Zaharim (2010) defined engineering skills as a capacity to apply engineering skills, personal traits and knowledge to secure and retain jobs and flourish in the engineering career. Today, engineering graduates are clearly need to demonstrate a higher confidence in their skills and ability from the previous predecessors (Yuzainee *et al.* 2011).

Abilities and knowledge are needed to solve mathematical, scientific, and engineering problems or computer-related tasks and other specific duties. People with technical

ability usually referred as a technicians in their related fields, such as audio-technicians, electronic technicians and engineering technicians. Due to the current challenges and globalization, competent engineers are sought by employers in the engineering sector (Hasan *et al.* 2012). In other words, today's engineering graduates should have required skills needed by industry (Hasan *et al.* 2012).

2.7.4 Teamwork skills

Riebe *et al.* (2010) suggested that the most important factor for engaging individuals in teamwork is to have a clear, conceptual framework. Gallie, *et al.* (2012) mentioned teamwork might not affect employees' motivation or experiences but that such effects will vary subject to predictors like the management's intention, the sector it is introduced and the employees' capacity to practice real control over their career.

Teamwork generally means understanding and the willingness of people to work together in a group to achieve the organization mission and vision. Members must be good team players. Teamwork also refers to the extent that workers can work on a task productively with others (Knight & Yorke, 2004).

Teamwork competencies is the ability to solve issues, set goals and manage performance, communicate effectively, plan and manage tasks and present to management to get and give feedback effectively, Halfhill and Nielsen (2007).

Teamwork means members work effectively and it happens only when the skills and strengths of individuals are combined with shared goals, and focused collectively on performance to see the output and benefits of teamwork. It also means the ability to support the outcomes with work with others, plan, understand the work group culture and make decisions with others. It is also about respecting others' views and ideas in the group, including leading where relevant and activating the group for high performance in projects or tasks. Teamwork means building collaborative relationship with colleagues and customers, negotiating, managing conflicts and working with diverse teams (Casner-Lotto & Barrington, 2006).

2.7.5 Specific personal skills

Personal skills can be described as traits of personality and behavior that ascertain people's action in a work environment, including their self-management, work performance and their interaction with co-workers and management personnel. According to Rychen (2002), interpersonal skills refers to the relationship and cooperation with others. Personal skills comprise leadership, creativity, linguistic and analytical skills. Prospective employees should be exact and expressive when detailing their personal skills.

Individuals should have some personnel and interpersonal capability, so them will decide and be attentive to the perspective of their parts even as the influence that they

may be self-confident and certain of their personal agendas if they're to attain reputational effectiveness, (Tsui & Ashford, 1994).

Scott and Yates (2002) said that interpersonal skills was the capability of doing job efficiently and empathize with anybody from various fields, listen to a variety of opinions before deciding, enhance and utilize network of colleagues to solve problems at workplace, acknowledge group dynamic, structure, and organizational influence, to collaborate with senior staff with no intimidation, offer positive comment, motivate others, without assigning personnel blame, and contribute positively for team-based projects (McLarty, 2000).

2.7.6 Adaptive skills

Adaptive skills refer to everyday and practical skills required to function and meet the environment's demands, comprising skills of taking care of oneself and to communicate (interact) with others effectively and independently. It also refers as an attitude that positively gears towards transformation, recognition and respect for diversified people and the capacity to offer creative ideas to accomplish a task.

Furthermore, Stropnik and Kodrič (2013) conducted a study and concluded that adaptive skills represent a conceptual, social and practical skill, with which people learn to act in everyday life, including an individual's capacity to fulfil the needs daily, considering the environment requirements. Well-developed adaptive skills are

reflected in the individual's independence in different environments; while low adaptive skills are associated with the individual's dependence and a greater need for supervision and assistance in daily tasks. This is supported by Marques-Quinteiro *et al.* (2013) that adaptive skills mean the ability to adjust, leading toward working systems sustainability.

Baard *et al.* (2013) found the result of performance, (adaptive result) or performance, (as action, adaptive performance), refers to an adaptation of workplace which is a multi-level condition comprising teams and individuals.

2.7.7 Self-emotional intelligence skills

Self-control refers to a self-regulation process or characterization of the individuals' pursuits who may already notice considerable control over a given task and adopt well-practiced routines for checking progress toward the relevant goal and creating necessary behavioral adjustment (Mischel *et al.* 1996). Mencl et *al.* (2016) added to this by stating that selection criteria may involve emotional skills and be developed if necessary to improve transformational leadership for any development efforts type of directing toward political or emotional skills ought to be based on needs of an individual in order to be effective. A key role in leaders' skills identification and development efforts is human resource development professionals.

Emotional intelligence is defined as an individual possessing an awareness and a capacity to control his or her emotions, that can be divided to four sections: self-awareness, self-management, relationship management and social awareness with each section includes a range of intra-related competencies (Stubbs *et al.,* 2008). Boud and Solomon (2001), viewed it as effective caution, which shows sensitivity of emotional and understanding of the some situation where sensitivity is combined with emotional responses of management effects in the professional relationship course.

2.7.8 Employers' Impression

Bolino, Varela, Bande, & Turnley, (2006) analyzed employers' impression which refers to how engineering graduates can be hired at entry-level of work based on their skills evaluated by the employer. In others words, employers' impression is the mechanism to affect others' views on prospective employees. It refers to how potential employees impress an employer that they have the engineering skills to enter the world of work. Leary & Kowalski, (1990) defined it as a process by which people tend to regulate others' reactions onto their images or ideas.

The idea is that engineering graduates use employers' impression to assure their prospective employer of their worthy assets (De Cuyper, 2010). In others words, employers must be convinced and agree that, the skills of the engineer are suitable and aligned with their needs. If the employers are not convinced, they will not hire the

applicants. In other words, the employer is not impressed with the engineering graduates skills.

Furthermore, graduates (engineering) need to impress the employer to hire or retain them in the organization by showing their unique skills. Employers will always look for candidates who fulfill industry needs. Therefore, engineering graduates need to create a good impression on the employer.

Employers will determine whether the skills of engineering graduates are aligned with their industry's needs; hence, engineering graduates need to create a good impression on the employer to help the employer decide.

In this study, the overall goal is to examine employers' impression role in moderating the relationship between engineering graduates' skills and employers' satisfaction. Employers' impression management categorized into: job focus, self-focus and supervisor focus (Wayne and Ferris, 1990). However, this study focuses on job focus and supervisor focus, which are related directly to this study. Past researchers have selected one or two or all the methods to discuss employers' impression. According to Barsness *et al.* (2005), some researchers have selected only one or two of the factors for discussion, as also agreed to by Bolino *et al.* (2006), Wayne and Liden (1995), and Bretz and Judge (1994), Researchers can choose any sub-components that are related to the study to be extended for further discussion. In this study, the researcher

focuses on supervisor and job focus, in terms of employers' impression of satisfaction with GE.

In general, Chen & Fang, (2008) stated that employers' impression focuses on any individual's behavior that tends to regulate others' impression. In other words, the employer will evaluate the candidate's behavior and attitude and if the employer is impressed with the candidate, it is more likely that the candidate will be hired. Impression behaviors are mostly instrumental and intentional, i.e., goal oriented (Rao, Schimidt, & Murray, 1995, Gardner & Martinko, 1998, Chen & Fang, 2008), That means engineering graduates must show employers that they have the best skills to be hired.

Employers can evaluate directly whether or not the engineers' skills, including their character, impress them. Many researchers have defined impression in an organization as behavior that workers (usually referred as actors), utilize to mold how others see them, (targets consist of supervisor and fellow workers, sometimes subordinates and customers) at workplace (Bozeman & Kacmar, 1997). It refers to how engineering graduates try to impress the employer. Usually, employers will be impressed if graduates can convince them and show that they are the most suitable candidate for the organization with high quality of work ability, discipline and maturity.

Employers' impression comprises two categories namely defensive and assertive. Defensive refers to the minimization or maximization of bad image through threats,

apologies or excuses and supplication, (Bolino & Turnley, 1999; Lewis & Neigbors, 2005). Assertive refer to the maximization of good image through others or self-enhancement which is mostly emphasized on supervisor. The purpose is to look eye-catching and be liked, for example, using praises (De Cuyper, 2010).

In others words, employers can be impressed with the appearance and the attitude of the engineering graduates and they can show the skills that they have which can help them to be hired and promoted. Meanwhile, job focus impression means to be competent; while self-focus impression means to appear as a model employee, such as someone who is commited, accommodating, dynamic and pleasant (Bolino & Turnley, 1999). This study focuses on the assertive impression on the supervisor and job focus, to show a cherished, appropriate and favorable image that is desired in the context of organizations (Chen & Fang, 2008).

Employers' impression moderates by the relationship between engineering skills and employers' satisfaction. This moderating variable examines the relationship between fundamental general skills, engineering skills, teamwork skills, specific personal skills, adaptive skills, self-emotional intelligence skills and employers' satisfaction.

Three factors determine employers' impression: goal value, goal relevance and the gap between present and required images (De Cuyper, 2010). This study views employers' satisfaction and impression as a permanent job offer possibility or one graduate is more desirable to be employed.

Employers' impression is a theoretical concept underlying other determinants like communications behavior (Sias *et al.* 1997); or in a result post-hoc interpretation (De Cuyper & De Witte, 2008). Hence, the empirically evidence is lacking.

Employability is partly the capacity to promote one's skills and competencies (Hillage & Pollard, 1998). In other words, to maximize one's good image (Hazer & Jacobson, 2003). This is one of the tactics that can be used to impress the employer of the skills the engineering graduates have been equipped with. Graduates should use this expertise to obtain work mobility (Viswervaran, Ones, & Hough, 2001). In other words, employers' impression relates to employability, especially employers' satisfaction, in general.

Moreover, the relationship between employers' impression and employers' satisfaction may derive from the employees' attempts to exhibit their values. Organizations may keep such employees and ultimately, choose them for promotional purposes (De Cuyper, 2010). Employers' satisfaction may also derive from the employees' attempts to form a good impression; for example, if they show they are being pursued by others employers, this scenario might raise the dynamics of supply-demand that is favored, leading toward employment (De Cuyper, 2010).

Besides, how others see people is the focal point in company, (Leary, 1995; Leary & Kowalski, 1990). Hence, a success self-presentation is crucial in getting a job and

employees are particular in how to project the right image to everyone after being employed. Bolino, *et al.* (1998) found that how others view them can influence others' acceptance toward them, whether or not they're viewed as capable and dedicated, the rewards they get and fast move up in the company.

2.8 Conceptual Framework

There are many frameworks and studies that relate to this study and some of them are very detailed. However, the conceptual framework developed by Zaharim *et al.* (2010), a popular model that is often used in this field, is selected as a guide for this study. Hence, this study is guided by and on based on the Malaysian Engineering Employability Skills (MEES) Framework proposed by Zaharim *et al.* (2010), as shown below:

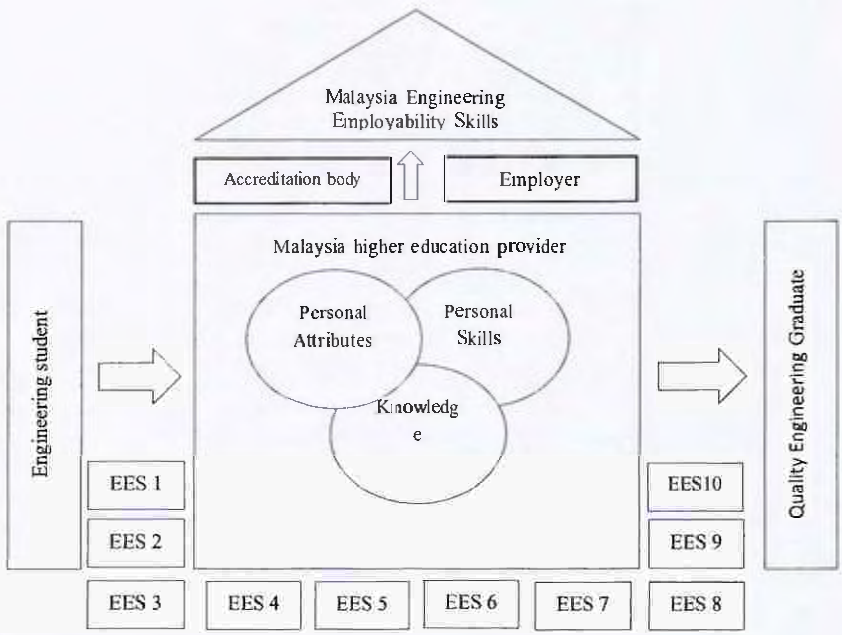

Figure 2.1: *Malaysian Engineering Employability Skills Framework (MEES)*

Source: Practical Framework of Employability Skills for Engineering Graduates in Malaysia (Zaharim *et al.* 2010)

The MEES framework consists of three main elements: 1) personal attributes; 2) personal skills; and 3) knowledge. They are blended with communication skills (EES1), teamwork (EES2), lifelong learning (EES3), professionalism (EES4), problem solving and decision-making skills (EES5), competent in application and practice (EES6), knowledge of science and engineering principles (EES7), knowledge of contemporary issues (EES8), engineering systems approach (EES9) and competent in specific engineering discipline (EES10).

This framework is aligned with this study's aims regarding the skills needed for employability of engineers. Due to that, it is chosen for conceptual framework for this study.

2.9 Underpinning Theories

The underpinning theories for this study are Human Capital Theory. This theory has been rigorously select from others theory that accurate to this study. This theory, which is originated from Becker (1964), states that education elevates productivity of an individual, which consequently, improves work performance. According to Yuzho (2013), with education, a marketable skills can be offers and also the relevant capability to overall performance work and with a high/level education their have, the more success they are in the labour market in relation to career opportunities and income.

Schultz (1963) said human capital was essential for improving organization performance, and securing sustainability and employees' productivity. Human capital is a process that involves professional and educational initiatives to enhance training, knowledge, values, skills and social properties that elevate employees' job performance and satisfaction and enhance organization performance (Marimuthu, Arokiasamy, & Ismail, 2009).

Furthermore, from the macroeconomic development perspective, the theory is essential. Becker (1993) used the theory in the education system where he argued that a variety of capital exists comprising education, computer training and health needs. Human capital is the skills, expertise and knowledge acquired by someone or individually through the medium of education and training.

Moreover, empirical proof yields that education investment is positively correlated with growth and development of economy (Olaniyan, 2008). Indeed, this investment is crucial for individuals and economic growth as well (Tan, 2014). Hence, a notion of education as a capital good links to human capital concept which stresses on skills development an essential determinant in production activities (Olaniyan, 2008, Tan, 2014).

This study have choose human capital theory as the underpinning theory. This theory explains the importance of education. This theory focus more on knowledge instead of soft skills acquisition to succeed in the workplace.

This theory is not new in research and has been used by previous researchers. For example, Husain *et al.* (2010) used this theory to investigate employability skills from the employers' perspective. Paadi (2014) examined the capability of skill to be employ and enhancing human resource management graduates' prospect of getting a job.

That is why this theory supports and underpins this study since it is education that provides the skills needed for productivity and the enhancement of job performance. This theory also explains the importance of education in equipping future engineers with the skills needed from time to time. This is important and necessary due to the changing and dynamic environment of engineering work as well as new technologies, with Industry Revolution 4.0.

Skills have to be updated accordingly to suit the demand of the industry and technology. If skills are not upgraded, engineers will be left behind and the consequences are that engineers can be fired. It is important for engineers to always be alert to the surroundings, not only locally but also internationally and to be alert with the emerging skills needed, for surviving and coping with future demands.

In addition, industries are competing for survival and sustenance in the market. Hence, industry must employ workers who can withstand the global pressures through developing human capital so workers can master the relevant skills (Husain, 2010). However, due to increasing costs, these employers expect HEIs to produce skilled graduates without additional training from the industry. Hence, highly skilled graduates are advantageous in securing jobs (Husain, 2010).

employed. This study tests the fundamental general skills (reading, writing, calculating, communicating, and using basic computer software) to determine the skills aspect for employability.

On the other hand, engineering skills means the ability to apply a procedure, technique and specialized knowledge required for a certain task. Engineering skills relate to the employers' satisfaction, especially in terms of analysing data and storing coding and retrieving it (Ahman *et al.* 2017). Engineering skills mean the knowledge the graduate has to use a software or machine to get the job done.

For this study, engineering skills is measured at the knowledge (engineering skill) and task level (problem solving) and is related to employers' satisfaction. Teamwork skill is essential when engineers work in groups, especially to solve a problem. In this study, the researcher examines the relationship of this variable with employers' satisfaction. This variable indicates the team working capability that leads to different roles of individuals in various teams (Harvey, 2012).

Specific personal skill is also chosen as an independent variable because it measures attitude, motivation and emotion of the engineering graduates from the employers' view. Specific personal skill refers to the capacity to interact with others while working which involve communication and listening skills along with attitude and mannerism (Ahman *et al.* 2017).

Adaptive skill is about everyday skills required to function and meet the job demands. It measures the graduates' self-learning process speed. In other words, it refers to the readiness to handle unpredictable tasks caused by jobs changing and work conditions (Savickas, 1997 cited in Zhaou *et al.* 2017). Further, empirical research has proven that adaptability is essential antecedent of numerous profession and jobs-associated effects, for example work engagement (Rossier, Staufffer, Maggiori, Zecca, & Dauwalder, 2012).

Basing on human capital theory, this study chooses employers' impression as a moderating variable. It emphasizes on education, which will make the engineers become successful in their job if they are equipped with the necessary skills. Skills can only be enhanced and upgraded through education, not necessarily by the HEIs but from others sources, such as own experience, from other engineer friends, from observation and others. From this, employers can determine whether engineers' skills are aligned to industry needs by forming their own impression. Employers also can evaluate the skills of engineers, to determine whether the skills are aligned with the work environment in their respective companies.

Furthermore, employers can predict from their own impression, the skills needed and give feedback to the HEIs to redesign the curriculum for their engineering students. From the employers' impression also, the engineers' competitiveness and competencies can be determined.

Employers tend to look at and evaluate the engineers' skills, especially from the job done and outputs achieved. Employers can determine their satisfaction level from the engineers' job output. From here, employers also can determine the kind of skills engineers must have to execute tasks well. In this case, education and learning have always been the key to engineers being successful in their job.

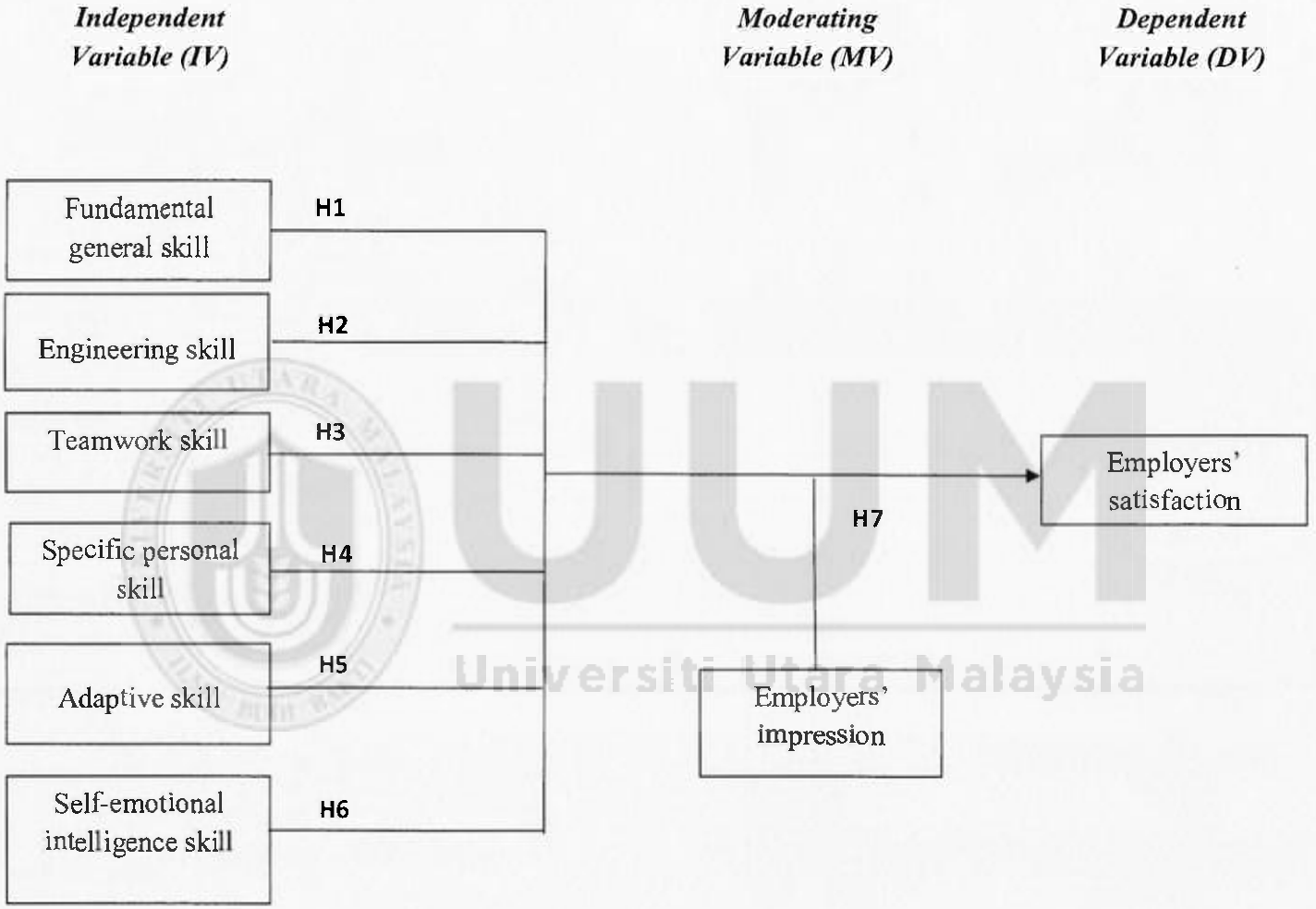

Figure 2.2.
Theoretical Framework

2.11 Hypotheses Development

Based on the research objectives and the conceptual relationship between the variables, the following seven hypotheses are examined and tested in this study:

2.11.1 Relationship between Fundamental General Skills and Employers' Satisfaction

As mentioned above, fundamental general skills mean the basic skills of engineers, such as reading, writing, calculating and communicating. This basic skill also encompass the ability to communicate fluently not only in the mother tongue, but also other languages, such as English. It also includes basic computer application skills, such word, interpreting graphs, excel, PowerPoint and managing and using information technologies. Becker *et al.* (1998) found that organizational skill and management skill are essential to successful engineering practice, and practitioners strongly emphasize that at entry level.

Nguyen *et al.* (1998) found that fluency in writing in another language (academic view), logic in thinking to solve problems and dedication in work are fundamental general skills needed by organization.

Zaharim *et al.* (2009) found that graduates of engineering should have a set off soft skills like interpersonal, problem solving, and communication. Meanwhile, Robinson

(2000) viewed basic skills are needed to acquire and keep the job as well as perform well on it.

Nguyen *et al.* (2005) found that communication skills, presentation skills, personality traits, taking initiatives and having flexibility are rated poorly by engineering graduates when these are the quality sought by employers. Zaharim (2009) to added values for them are to integrative ways about engineering and think broadly in fundamental skills

Therefore, the study proposes the following hypothesis:-

H1 : There is a positively significant relationship between fundamental general skills and employers' satisfaction.

2.11.2 Relationship between Engineering Skills and Employers' Satisfaction

Taking into account employers' expectation of the skills demanded is essential in preparing graduates for workforce (Yuzainee *et al.* 2012). Industry needs well-equipped graduates with skills required by industry. Furthermore, competent engineers are highly needed in the emerging challenges in economy and globalization (Hasan *et al.* 2010). Hence, the most crucial skill for engineers are engineering skills in order to be employed. Basic engineering skills, like operating a computer, reading data, using engineering software and knowledge about basic engineering tools, are necessary. Currently, profession of engineering profession is rapidly changing in terms of input,

tools, process and systems. Consequently, engineers must possess a strong theoretical background with the required skills, (Zaharim *et al.* 2010).

In addition, new engineers must continuously upgrade and adapt to the new challenges, chances and changing environment through applying skills like problem solving, self-learning, and others (Zaharim *et al.* 2010). A piece of paper (degree scroll) today no longer ensures a graduate entry-level job; it is the skills that the graduate possesses that will determine the graduate's performance in the labor market (Lim & Mustafa, 2013). The hypothesis, proposed:

H2 : There is a positively significant relationship between engineering skills and employers' satisfaction

2.11.3 Relationship between Teamwork Skills and Employers' Satisfaction

The review of literature has shown that teamwork skills and employers' satisfaction relation a positive. For example, Zaharim *et al.* (2009) found that the ability to play the roles in a group and as an individual with leadership or management capacity is essential besides being an effective group member, as the second satisfactory factor for employers in Malaysia. Curry *et al.* (2003, cited in Jackson, 2009) mentioned Irish employers value teamwork skills, which is ranked the second most important transferable skill.

Sijtsema *et al.* (2009) found that by using teams, work can be distributed, decisions that are more effective can be made and unique ideas and solutions generated. Juan *et al.* (2009) mentioned that teamwork skills indirectly incur several other skills, like communication, time management skills, interpersonal, leadership, group problem solving and negotiation.

In short, teamwork is the capacity to work collaboratively and productively on a given task with team members, (Knight & York, 2004) and to resolve a problem collectively with other team members to get significant and effective results and outcomes.

Based on the discussion, a hypothesis is proposed as follows:

H3 : There is a positively significant relationship between teamwork skills and employers' satisfaction.

2.11.4 Relationship between Specific Personal Skills and Employers' Satisfaction

Personal skills refer to creativity, leadership, linguistic and analytical skills. These are the behavioral characteristics that reflect people action in a work environment, managing, performing tasks and interacting with other employees. Tsui and Ashford (1994) stated that some interpersonal and personal capability must be possessed by an individual so that he or she can ascertain and give feedback to their constituents' view, hence, demonstrating their self- confidence and firmness of their own agendas.

Saeki *et al.* (2014) mentioned that specific skills refer to the positive influence of trust in cultivating relationships. Saeki *et al.* (2014) further described specific personal skills as a win-win situation of trust development in an effort to enjoy the specific skills benefit. Putnam *et al.* (1993) found that specific skills is about building a positive social relationship. This statement is agreed through Saeki *et al.* (2014) who mention that it is the ability to develop an honest relationship to perform a job successfully.

In short, the ability to work with others from all walks of life, listen to various points of view, build a network with others and provide constructive feedback are specific personal skills (Scott & Yates, 2002).

Based on the discussion above, the study proposes a hypothesis as follows:

H4 : There is a positively significant relationship between specific personal skills and employers' satisfaction.

2.11.5 Relationship between Adaptive Skills and Employers' Satisfaction

Past studies have determined that there is a strongest relationship between job content and career adaptability while an extended tenure and low level of work self-efficiency are reported by employees, (Zhou *et al.* 2017). Hence, organizational managers can

benefit from this study in order to strategize plans for profession adaptability development in managing with work-related experiences, (Zhou *et al.* 2017). Furthermore, individuals must be increasingly fluid and adaptable in the global dynamic growth today, (Fugate *et al.* 2004).

Coleman (2000) put adaptive skills as one of the skill categories to assist a person to perform with flexibility, enthusiasm, and friendliness in new surroundings. Moreover, employers look for skills like agreed to follow supervisor's instructions and efficiency, capability to be with others workers prior to employing a new worker skills include, (Paadi, 2014).

Adaptive skills level affects job stress and satisfaction by through their indirect effects on employees (Fiori, Bollman, & Rossier, 2015); attitude of self-exploratory (Guan *et al.* 2014); and certain adaptabilities (concern and control); and life satisfaction and their indirect effects on meaning of life and experiences of work volition (Buyukgoze-kavas, Duffy, & Douglass, 2015). Ramos *et al.* (2017) found that adaptive skills function as an essential mechanism of self-regulatory in dealing with stress and instilling wellbeing at the workplace.

Additionally, adaptive skills refer to the willingness for time, space and those (shifting in the direction of or ahead, far from or in opposition to) adaptation, impulse control, prescription and discretion in instruction, initiative, resourcefulness and authority.

(Cronshaw *et al.* 2005). Dawis and Lofquist (1984) found that adaptive skills are parallel although not duplicated by its concepts that study the work adjustment.

Cronshaw *et al.* (2005) found that adaptive skills are about workers' development in to better comprehend issues like job development, job choice, maturity and discovery, adaptation, engineering adjustment and maintenance and transition of positive job attitude, such as organizational and commitment job satisfaction.

In short, the concepts of knowledge, skills, abilities and other characterristics, (KSAOs) is very essential and important by employers and must be acquired by employees (Fugate *et al.* 2004). Employees have to capable of continually control change in themselves and their surroundings to survive in this turbulent environment (Fugate *et al.* 2004). Therefore, the study proposes a hypothesis as follows:-

H5 : There is a positively significant relationship between adaptive skills and employers' satisfaction.

2.11.6 Relationship between Self-Emotional Intelligence Skills and Employers' Satisfaction

Past studies have show that self-emotional intelligence skills are behavioral adjustments, defined as self-control (Mischel *et al.* 1996), an awareness and a capacity to control emotions (Stubs *et al.* 2008). It is about how the engineering workers

demonstrate sensitivity and understanding of the emotional complexities of a particular situation (Boud and Solomon, 2001).

Furthermore, a individual with excessive emotional intelligence is more conscious of his or her own emotions and also as to others', better able to recognize his or her feelings and communicate them appropriately (Mayer and Salovey, 1993). From these finding also, the Self-emotional intelligence skill often influences choices of behavior at workplace and weaken rational choice of most reliable guide of action (Leith and Baumeister, 1996). Hence, Self-emotional intelligence skill means capability and the capacity to recognize and comprehend one's own emotion and other people emotion and intention (Gardner, 1983).

Rozel *et al.* (2010) found that Self-emotional intelligence skill refers to understanding and managing emotion. It is also a noteworthy and compelling variable in group satisfaction. This means emotional intelligence can refer to group satisfaction and a relationship exists between workers.

Liu (2013) found that Self-emotional intelligence skill have negative effect on the relationship between team members and leader of the company and on team members' job satisfaction. Santos *et al.* (2013) stated, Self-emotional intelligence skill a partly link to emotional labor, exhibiting a negative relationship with surface acting but not with deep acting.

Christie *et al.* (2015) found that Self-emotional intelligence skill means the potential to understand emotions and feeling in relation of trust and show the view of others (capability and integrity) and individual emotional intelligence (perceiving) are combined to expect a big portion of the variant of trust. In other words, a person with Self-emotional intelligence skill can gain the trust and confidence of other people.

It can be concluded therefore that emotional intelligence is essential when faced with certain situations; it can show the maturity of engineers in controlling their emotion. Based on this discussion, a hypothesis is proposed:

H6 : There is a positively significant relationship between self-emotional intelligence skills and employers' satisfaction.

2.11.7 Relationship between Employers' Satisfaction and Skills Ability Moderated by Employers' Impression

Zaharim *et al.* (2009), studies about perception and satisfaction level of engineering graduates skills at the workplace; and the employers' expectation of the skills needed in engineering graduates for future career have found that most industry was satisfied regarding graduates' level of knowledge and skills they have hired. However, young engineers must equipped with abilities and skills relevant to the current global change Hence, employers' expectations and perception are essential in ascertaining the skills required (Zaharim *et al.* 2009).

Zisnuska, Carlson, Witt, Bratton and Kacmar (2004) examined impression as a variable for the connection between perception of politics and supervisors' rating of work performance. They have found that impression increases performance rating and related to work performance. Harris *et al.* (2007) investigated the relationship for political skills between impresion and supervisors' rating of subordinates' performance as a moderating variable. They found that person with huge levels of impression tend to get high performance rating. In addition, Lam, Snape and Huang, (2007) state that supervisors give negative feedback on subordinates' feedback when impression is dominant and viewed as being driven by concerns.

Based on these findings, a hypothesis is proposed:

H7: There is a positively significant relationship between entry-level engineers' skills and employers' satisfaction moderated by employers' impression.

Furthermore, based on the main objective of this study and the relationship between the variables and the moderator (H7), it is assumed that the relationship with employers' satisfaction can be direct or indirect. Therefore, the following six hypotheses for the moderating variable (employers' impression) are examined in this study as follows:-

H7a: There is a highly positive and significant relationship between fundamental general skills and employers' satisfaction moderated by employers' impression.

H7b: There is a highly positive and significant relationship between engineering skills and employers' satisfaction moderated by employers' impression.

H7c: There is a highly positive and significant relationship between interpersonal skills and employers' satisfaction moderated by employers' impression.

H7d: There is a highly positive and significant relationship between behavioral skills and employers' satisfaction moderated by employers' impression.

H7e: There is a highly positive and significant relationship between adaptive skills and employers' satisfaction moderated by employers' impression.

H7f: There is a highly positive and significant relationship between self-emotional intelligence skills and employers' satisfaction moderated by employers' impression.

2.12 Identification of Skills Gap

Most engineers and employers agree that local HEIs graduates lack both effective oral and written communication skills. To prepare graduates to be professionals, mastering

these soft skills is the most important. Future of Engineering Education in Malaysia (2006), has mention this issue has long been debated, especially concerning engineering graduates from HEIs in Malaysia. Further, the highest skills gap has to do with problem solving abilities, i.e., solve problems, the ability to communicate effectively, work in group/team and utilize system designs, including operational performance.

This statement concerning the skills gap is supported by the Graduate Employability Blueprint 2012 -2017 (MOHE, 2012), which reported about the skills gap among graduates, such as the generic skills approach, mismatch of courses and the preference of industries for readymade instead of fundamental graduates.

In addition, previous studies by the Centre for Instructor and Advanced Skills Training (2007), the Ministry of Human Resources (2011), Universiti Putra Malaysia (2012) and Rajiv (2009), have found a gap in terms of skills between the employers' requirements and training centres' availability (cited in Ridzwan, C.R., Ruhizan, M. Yasin, 2015).

On 7 April 2015, the then Prime Minister launched the Malaysian Education Blueprint (MEB) 2015 -2025 for graduates beyond 2020. There are 10 shifts in these guidelines, and shifts 2 and 4 relate to this study with regards to closing the skills gap in graduate employability and the ways to achieve the objectives of the policy. It is essential to

look into this gap if want to produce better graduates parallel with the government's aspirations to be a modernized country.

Furthermore, the National Association of Manufacturers (NAM, 2005) reported that more than 80% of the companies surveyed are affected by the skills gap. Competition in the global environment has increased rapidly and created large gap between the delivery of available skills and the performance requirements of the workforce for modern global manufacturing. The skills gap report shows that high-performance workforce is the most vital factor for an organization's future (74%); about 53% of the respondents expected a shortage in basic employability skills; and about 55% indicated the most specific deficiencies in the public education system are in basic employability skills.

Kalafsky (2008) conducted a research at Charlotte, North Carolina, on the workforce shortage inside the manufacturing sector; he found that most of the firms was seriously concerned with the shortage of skilled labour. In addition, Kalafsky (2008) mentioned that firms that rated or measured labour shortage as an important issue tended to be those that were having difficulty in retaining skilled workers and were locked in competition with other firms for potential employees.

Bloom and Saeki (2012) discovered that the skilled graduates' shortage is among the major hindrances to the Indian economic growth. They also confirmed the widespread dissatisfaction of firms with the soft skills of current graduates, as the firms consider

soft skills to be a core employability skill together with communication skills. Bloom and Saeki (2012) concluded that they did not have a specific explanation as to why the core employability skills, especially reliability and self-motivation, remain the factors with the largest skills gap.

Jackson (2009) mentioned that the industry and trade would welcome effective ways to close the gap in the skills of graduates. According to the National Graduate Blueprint (2012), in general, several major predicaments are being faced by employers with regard to job mismatches, shortage of technical and science graduates, graduates who are not qualified and not equipped with necessary engineering skills and the number of jobs needed in the nation.

Malaysia, a rapidly developing country and among fastest growing countries in the Asian region, with an emphasis on the industrial sector as the backbone of its economic development, which encompasses the development of industries and organizations. The establishment of industrial zones for the commercialization of industries has also opened up job opportunities in several geographical areas.

2.13 Chapter summary

From the literature review of previous studies, it remains unclear why gaps still exist in terms of the skills ability required by employers and skills of engineering graduates. Even though some researchers have discovered the most important skill needed by employers is communication skill, it remains unclear as to what skills are actually needed the most or which are the most valuable for employability in the eyes of employers. It is also agreed, as mentioned in the literature, that there are bottlenecks in the skills gap, which still cannot be determined by researchers. From the literature, it is learned that researchers are still finding means to close the gap between the industry need and demands and the skills of graduates'. This chapter provides the conceptual framework and its hypotheses also. The details regarding the research methodology are discussed in Chapter 3.

CHAPTER3

RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter reviewed the relevant literature on engineering GE and their skills. This chapter discusses in detail how the study was carried out. This chapter provides the results of the pilot study, research design, instrumentation and measurement, collection of the data and analysis of the findings.

3.2 Research design

This section discusses in detail how this study was carried out. The discussion includes the sampling technique, sample size and population, data collection and research procedures. The research design focus is to spell out the techniques and procedures in order to collect the data. This is to clearly show the proposed study is relevant to the research problem. In addition, the research design assists in the selection of the most cost-effective procedure for conducting the research..

This study utilized a quantitative research design to enable researcher to assess the variables' relationship (Kreuer & Neuman, 2006). Reliability determines either one concept or idea is better than the alternatives (Anderson, Sweeney & William, 2000);

and can show the relationship among the measured variables for clarifying forecasting and controlling phenomena (Leedy & Ormrod, 2005).

Due to that, a quantitative research design is more suitable for this study as it firstly, test the relationship between variables using statistical methods. This is in line with the main objective of this study, which is to investigate the direct relationship between the variables (Fundamental General Skills, Engineering Skills, Teamwork Skills, Specific Personal Skills, Adaptive Skills and Self-Emotional Intelligence Skill) and Employers' Satisfaction. It also examines the moderating effect of Employers' Impression. Second, analysis on large samples can be executed, where a generalization can be applied to the whole population. Thirdly, the research design allows a standard and formal questionnaire to be used and given to each sample.

Additionally, this study is carried out in the organization natural environment where the researcher's interface is minimal. Hair, Jr., Money, Samouel, and Page (2007) and Zikmund (2003) agreed that high external validity and more robust, relevant and more comprehensive findings would result from conducting a study in a natural environment creates.

A unit of analysis for this study is the organization level (senior managers of the company) and the main data were gathered using questionnaires. Participants' satisfaction with the variables (Fundamental General Skills, Engineering Skills, Teamwork Skills, Specific Personal Skills, Adaptive Skills and Self-Emotional

Intelligence Skill) is crucial for understanding their influence on Employers' Satisfaction. The study also examines the extent of the moderating effect of Employers' Impression on Employers' Satisfaction. Hence, using the individual as a unit of analysis to test the variables is deemed suitable as shown in the research framework.

Furthermore, a research design is a general plan on answering the questions (Saunders, Lewis, and Thornhill 2012). It can be described as a growth or strategic plan for the research project, which sets out the broad outline and the main features of the work to be tackled, including the methods of data collection and the analyses to be employed. It also shows how the research strategy can be implemented to achieve the specific targets and objectives of the research, and to determine whether the issues being studied are policy-oriented or theoretical.

To make it even clearer, Cooper and Schindler (201 I) defined research design as the planning and the structure of the investigation to get answers for the research questions, where the planning is all about the program or scheme of the study and includes the planning process for researchers to do the research, determine hypotheses, write and analyse the final data. Figure 3.1 depicts the research flow for this study.

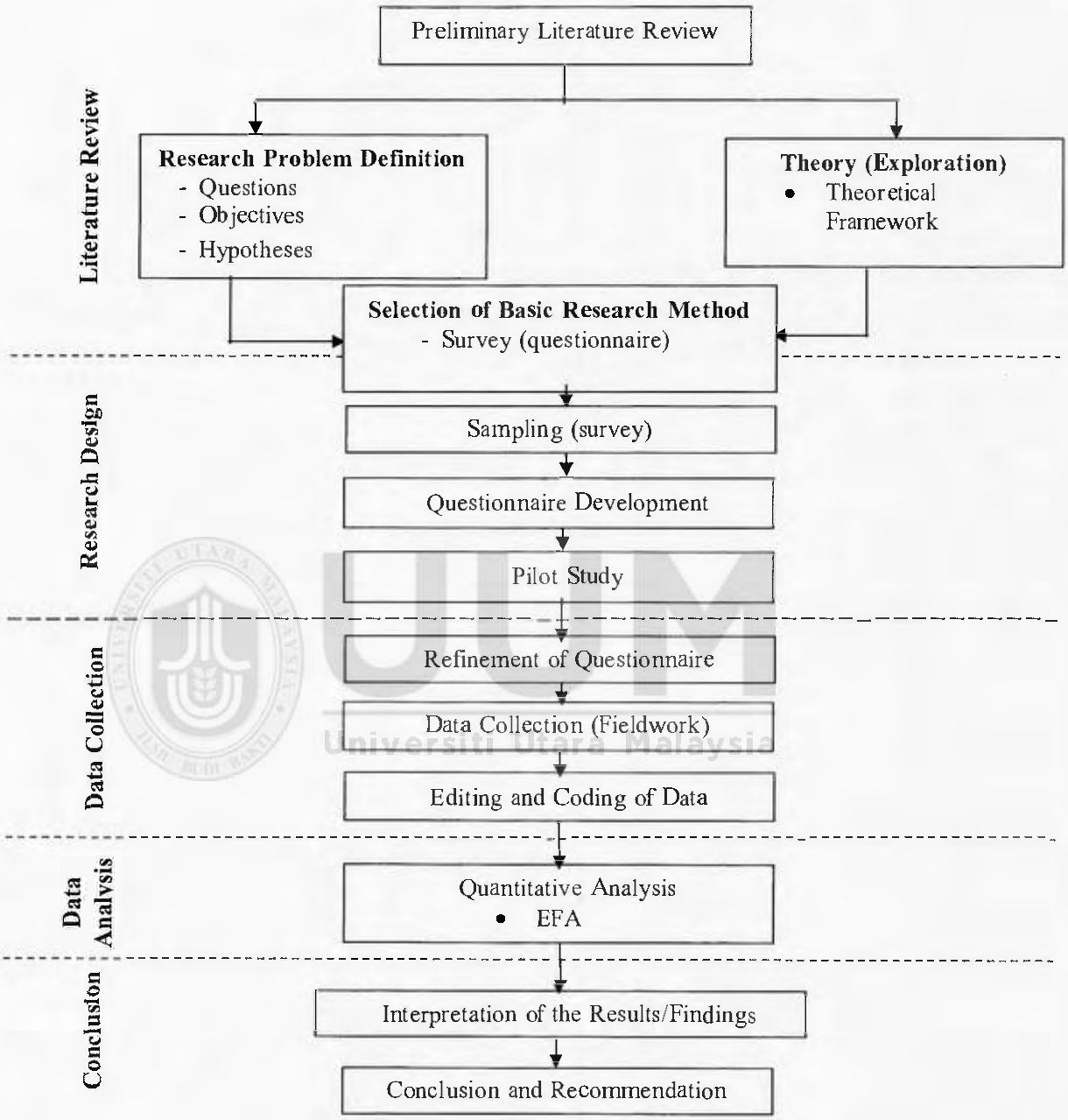

Figure 3.1
Flowchart for the Research Process

3.3 Population and Sample Size

The samples of this study includes all manufacturing employers in Malaysia; however, the focus for this study are the states of Negeri Sembilan, Melaka and Pulau Pinang. Focusing on particular states for conducting a study among Malaysian employers is common in the context of education. For example, Zaharim (2010) focused only on the Klang Valley, Malaysia to conduct a study to investigate the engineering skills as perceived by employers.

For this study, the target population is the employers who hired entry-level engineers from HEIs. The researcher randomly selected the companies at the Industrial Zones of Alor Gajah, Melaka Tengah and Jasin Industrial Park, Melaka; Nilai Industrial Zone, Negeri Sembilan and Bayan Lepas Free Industrial Zone, Pulau Pinang. All employers contacted from these industrial zones were found using the FMM Directory, 2015.

The samples for this study are 477 manufacturing companies out of the total numbers of 2,457 manufacturing companies located all over Malaysia, as shown in Table 3.1, including the number of employers for each of the three states. Employers were chosen from these three states because these three states have the highest output of manufacturing products (DOSM, 2015), thus making it an ideal setting for this study.

This study focuses on manufacturing companies. Thus, the unit of analysis for this study is the organization senior managers who are involved directly with engineering

workers. The questionnaire was distributed to these senior managers as representative to the organizations.

The sample population was divided according to the tabulation shown in Table 3.1 below, from which the samples required from Melaka, Negeri Sembilan and Pulau Pinang were determined. From the data, the questionnaires were distributed accordingly to the selected industry players in those three states.

Table 3.1:
Sampling population according to region and state

Region	**State**	**Total no of employers**
South	Melaka	108
West Coast	Negeri Sembilan	81
North	Pulau Pinang	288
	Total	**477**

3.3.1 Sampling Size

Due to the big population, it is not practical to gather as a whole (Zikmund, 2003). Hence, a process of sampling is needed to ascertain the sampling size needed. Generally, sampling process involves three stages: identifying the population; sample size; and selecting samples. The total population is 2,457. However, only 477 manufacturing companies were chosen as the sample of this study, comprising manufacturing companies in Melaka, Negeri Sembilan and Pulau Pinang, according to the FMM Directory, 2015. The sample size for this study is 210, basing on the sample size table by Krejcie and Morgan (1970). Hence, 210 manufacturing companies are needed to represent the whole study population. This sample size adhered to Roscoe's rule of thumb where samples larger than 30 and less than 500 are deemed appropriate for most research. Nevertheless, 238 questionnaires were to be distributed to get higher response rate. As argued by Hair, Black, Babin, Anderson, and Tatham (2006), a large sample size is needed to be able to generalize to the whole population.

3.3.2 Sampling Technique

This study applied the random sampling technique to allow the elements in the whole population to have a known chance or probability of being selected as the sample subjects. This type of sampling is chosen because the representativeness of the sample is important for the purpose of generalization. This technique often enhances the representativeness of the sample through sampling error reduction.

In this study, all the 477 respondents from the three states were chosen using random sampling. Random sampling reduces human bias potential in the selection of cases to be included in the sample and is simple to execute. Gay and Diehl (1996) stated that systematic random sampling has six stages: first, define the population (in this study, the total population is 2,457). However, the researcher only chose 477 as this represents the total number of companies in the three states according to the FMM Directory, 2015; second, ascertain the desired sample size. The sample size of this study is 238; third, determine the population list. The list was obtained from the FMM Directory, 2015; fourth; ascertain the K by dividing the population by the desired sample size. In this case, K is equal to 2 (477/238=2.00); fifth, determine the total number of respondents for each state (Refer Table 3.2); and finally, choose a number randomly from the list as an initial number. Then every 2nd name was automatically inserted in the sample.

Prior to the questionnaire distribution, probability sampling was determined using this formula:

Probability sampling of employers = **NP/T*NS**

(NP – Total number of employers in the three states, T = Total number of respondents, NS = The number of samples to be distributed)

Table 3.2

Distribution of respondents for each region and state (Melaka, Negeri Sembilan, Pulau Pinang)

Region	State	Total Number of Employers (N=477)	Total Respondents (S = 238)	% of Sampling	System Random
South	Melaka	108	55	23	2nd
West Coast	Negeri Sembilan	81	40	17	2nd
North	Pulau Pinang	288	143	60	2nd
Total		477	**238**	**100%**	

This study randomly selected 238 manufacturing companies by using the Table of Random Numbers. Hence, the researcher distributed 238 questionnaires to the 477 manufacturing companies as the respondents. All data regarding the names, the total number and complete addresses of all manufacturing companies located in the three states were taken from the FMM Directory, 2015.

3.4 Items measurement

The measurements adapted in this study are covered in subsections. The discussion begins with the dependant variable, followed by the independent variables and moderating variable.

3.4.1 Employer' Satisfaction

Employers' satisfaction is the dependant variable in this study. The items were developed from literature. The five items are according to the recent situations and were adapted to suit this study. The items measure employers' satisfaction with the engineers' skills in the company. Respondents were to rate their response on employers' satisfaction items using a five-point scale where 1 = highly not satisfied and 5 = highly satisfied, as shown in Table 3.3.

Table 3.3

Employers' Satisfaction Items

Variable	Components	Operational Definition	Items	Authors
Employers' Satisfaction	Employers' satisfaction	Employer is satisfied with the entry-level engineering skills of their engineers	1. Overall, are you satisfied with young engineers who you hired (new engineers who have less than three years of experience)? 2. Do you think entry-level engineers that your company hired are fully equipped with the necessary skills? 3. Overall, are entry-level engineers who your company hired are very skilful and highly talented in engineering work? 4. Entry-level engineers who have been hired by your company are well trained by Malaysian public HEIs. 5. Overall, all entry-level engineers who have been hired by your company have been fully moulded according to the manufacturing company's needs.	Zaharim *et al.* (2009) Bloom & Saeki (2012)

3.4.2 Fundamental General Skills

Fundamental general skills is an independent variable. Fundamental general skills refer to the basic skills, such listening, communication skill, ability to use different computer applications and demonstrate basic computer soft skills. As shown in Table 3.4, fundamental general skills is measured by eight items, adapted from Bloom & Saeki (2012) and Zaharim *et al.* (2010). The eight items have been proven to be reliable and valid for general skills measurement. Some studies report the instrument's adequate internal consistency (Cronbach's alpha ranges from .70 to .90) (Yuzainee, 2012). Respondents rated their views on the basic individual skills, basic computer literacy and basic appearance statements using a five-point Likert scale, where, 1 = highly not satisfied and 5 = highly satisfied.

Table 3.4

Fundamental General Skills Items

Variable	Components	Operational definition	Items	Authors
Fundamental General Skills	Basic individual skills	The extent of basic knowledge and/or engineering skills ability	1. Demonstrate listening skills 2. Demonstrate high communication skills (English) 3. Able to communicate in other languages (English, Mandarin, etc.) 4. Knowledge of contemporary issues.	Bloom& Saeki, (2012), Zaharim *et al.* (2010), Yuzainee *et al.* (2012)

Table 3.4 (continued)

Variable	Components	Operational definition	Items	Authors
	Basic computer literacy	The degree of basic knowledge to use computer software	5. Understand information presented in a variety of forms (graphs, charts, diagrams, etc.) 6. Use different computer soft skills for simple tasks (word processing, such as formatting, inserting graphics into documents, etc.) 7. Demonstrate basic computer soft skills for simple tasks (word processing, such as formatting, inserting graphics into documents, etc.).	Bloom & Saeki (2012)
	Basic appearance	Individual style	8. Show good personality in terms of dressing and style.	MOHE (2012)

3.4.3 Engineering skills

The researcher adapted 11 items from Bloom and Saeki (2012), Zaharim *et al.* (2010), Yuzainee *et al.* (2012) and Hasan *et al.* (2007), which show that this measurement is important to determine the skills engineers must be equipped with as perceived by employers. These items measure engineering skills needed by the employers in their organization. These items are important to this study as they measure the skills needed by employers from their perspective. Past studies have confirmed the instrument's adequate internal consistency (Cronbach's alpha ranges from 7.0 to 9.0) (Yuzainee *et al.* 2011).

The researcher modified the questionnaire to be aligned with this study and developed the questionnaire items as shown in Table 3.5. Respondents rated their views using a five-point Likert scale, where 1 = highly not satisfied and 5 = highly satisfied.

Table 3.5

Engineering Skills Items

Variable	Components	Operational definition	Items	Authors
Engineering skills	Knowledge and "Hands-on" ability	The extent of knowledge and skills that engineers have for problem solving and decision-making	1. Ability to apply knowledge of mathematics, science and engineering. 2. Skills/ability to use engineering tools effectively (other than computer) 3. Ability to design a system, component or process to meet desired needs. 4. Ability to identify, formulate and solve engineering problems. 5. Ability to design and conduct experiments, analyse and interpret data.	Zaharim *et al.* (2010) Yuzainee *et al.* (2010) Bloom& Saeki (2012) Hasan *et al.* (2007)

Table 3.5 (continued)

Variable	Components	Operational definition	Items	Authors
	Apply and ability	The degree of engineering knowledge to apply in work/tasks.	6. Demonstrate knowledge and understanding of engineering systems. 7. Ability to analyse engineering designs. 8. Ability to apply skills, access to and knowledge of basic science and engineering fundamentals. 9. Ability to apply knowledge in multidisciplinary engineering. 10. Ability to use techniques for engineering practices in work. 11. Demonstrate ability to use modern/latest engineering software.	Zaharim *et al.* (2010), Bloom& Saeki (2012)

3.4.4 Teamwork skills

Teamwork skills is the third independent variable of this study. In this study, teamwork skills measure the engineers' skills to work in a group and their participation in teams. It shows the commitment of engineers to participate in tasks given and how they interact with other engineers. The instrument has adequate internal consistency (Cronbach's alpha ranges from .78 to .89) (Mohd Yusof, H. *et al.* 2012). In this study, teamwork skills is measured by 11 items developed by Zaharim *et al.*(2009), Yuzainee *et al.* (2012) and Bloom and Saeki (2012).

Respondents rated their views on the understanding, responsibility, acceptance, contribution, willingness and leadership statements using a five-point Likert scale,

where, 1 = highly not satisfied and 5 = highly satisfied. Table 3.6 below shows the teamwork skills items used in this study.

Table 3.6

Teamwork Skills Items

Variable	Components	Operational definition	Items	Authors
Team-work Skills	Understanding	The extent of understanding of business conduct and rapport with others.	1. Understand and aligned with business conducted. 2. Understand role in a group. 3. Demonstrate appropriate skills when interacting with others (supervisors, customers, colleagues and others) 4. Respond to constructive criticism in the group.	Zaharim *et al.* (2010), Yuzaine e *et al.* (2012)
	Responsibility, acceptance, contribution and willingness	Highly accepts other colleagues' skills, weaknesses and contributions	5. Accept differences and diversity of individuals within the group. 6. Contribute to the team by sharing information and knowledge.	Zaharim *et al.* (2010), Bloom & Saeki (2012)
	Leadership	The extent as a leader in a group to work commitment	7. Demonstrate efficient leadership when needed. 8. Good interpersonal relationship in teamwork. 9. Function efficiently in a group as team member. 10. Accept and provide feedback in a constructive and considerate manner. 11. Function effectively as an individual and worker.	Mohd Yusof, H. et al. (2012), Bloom & Saeki (2012), Gurchara n, S.G,K & Garib S. S, K.(2008)

3.4.5 Specific Personal Skills

The researcher adapted specific personal skills from Bloom and Saeki (2012). This is the fourth independent variable in this study. In this study, specific personal skills measure the engineers' personal commitment toward successful manufacturing work, especially in terms of self-commitment towards the job assigned. It also measures the attitude and maturity of the engineers toward the jobs assigned. Specific personal skills is assessed through 10 items of Bloom and Saeki's (2012). Past studies verified the instrument's adequate internal consistency (Cronbach's alpha ranges from .70 to .90) (Bloom & Saeki, 2012) Respondents rated their views on motivation, problem solving, flexibility, education, learning, maturity, attitude, time management and procedure statements using a five-point Likert scale, where, where 1 = highly not satisfied and 5 = highly satisfied. Table 3.7 shows the specific personal skills items used in this study.

Table 3.7

Specific Personnel Skill items

Variable	Component	Operational definition	Items	Authors
Specific Personnel skills	Motivation, problem solving, flexibility	The extent of commitment and ability to work under pressure .	1. Practice time management in completing assigned tasks. 2. Demonstrate accountability to work under pressure. 3. Shown an ability to work under pressure.	Zaharim *et al.* (2010)

Table 3.7 (continued)

Variable	Component	Operational definition	Items	Authors
	Education, learning	The extent of learning, education and ability to balance life and work.	4. Commitment to life long-learning. 5. Ability to balance work and personal life. 6. Learn from previous mistakes. 7. Identify entrepreneurship skills.	Zaharim *et al.* (2010), Bloom & Saeki (2012)
	Maturity, attitude	The degree of willingness, maturity and attitude of engineers to work independently.	8. Engineers' skills are in accordance with this company's needs. 9. Identify new approaches to solve problems (creativity). 10. Demonstrate ability to work independently (reliability). 11. Maintain self-control (maturity). 12. Display positive attitude towards work.	Bloom & Saeki (2012), Van Der Heijde, C.M.& Vander Heijden, B. I. J. M. (2009)
	Time management	Punctuality	13. Demonstrate punctuality at work.	Bloom & Saeki (2012)
	Procedure	Follow policies and company procedures.	14. Use appropriate occupational safety practices.	MOHE 2012

3.4.6 Adaptive Skills

The researcher adapted this measurement from Bloom and Saeki (2012). Adaptive skills measure the engineers' ability to adapt to the job environment and their ability to adapt to new tasks creatively. Several studies have verified the instrument's adequate internal consistency (Cronbach's alpha ranges from .70 to .90 (Bloom & Saeki, 2012).

Seven items were used to measure the adaptive skills variable. Respondents rated their views on the personality, credibility, creativity, being fast learners and capability statements using a five-point Likert scale, where, 1 = highly not satisfied and 5 = highly satisfied. Table 3.8 shows the adaptive skills items used in this study.

Table 3.8

Adaptive Skill Items

Variables	Component	Operational definition	Items	Authors
Adaptive skills	Personality, credibility, creativity, fast learner and capability.	The extent of differences in terms of personality, individual skills and unique self-credibility and capability.	1. Illustrate individual skills to resolve problems. 2. Ability to show different personal skills from other graduate engineers. 3. Show uniqueness in terms of skills, attitude and knowledge. 4. Display individual intelligence and genius. 5. A fast learner in learning or doing a job. 6. Demonstrate individual creativity in work and to solve problems 7. Demonstrate high knowledge, skills, attitude and other characteristics (KSAOs).	Bloom & Saeki (2012), Van Der Heijde, C.M.& Vander Heijden, B. I. J. M. (2009)

3.4.7 Self-emotional Intelligence Skills

Self-emotional Intelligences Skills is measured by observation, willingness, motivation stability, ethics and integrity. These components measure the emotion of

engineers when doing a job and how they face work pressure in the work environment. Engineers should know how to observe the situations that happen. Respondents rated their views on the observation, willingness, motivation, stability, ethics and integrity statements using a five-point Likert scale, where, 1 = highly not satisfied and 5 = highly satisfied. Table 3.9 shows the Self-Emotional Intelligence Skills items used in this study.

Table 3.9

Self-Emotional Intelligence Skills Items

Variable	Components	Operational definition	Items	Authors
Self-emotional intelligence skills	Observed, willingness, motivation	The extent of motivation, inner and adapt to new environment	1. Adjust to workplace changes (Flexibility) 2. Practice ways to resolve conflicts. 3. Display evidence of self-esteem, confidence and self-motivation. 4. Show willingness to be relocated, if needed.	Van Der Heijde, C.M.& Vander Heijden, B. I. J.M. (2009)
	Stability	The degree of emotional stability and attitude toward job	5. Show stability in terms of emotional, attitude and style. 6. Show positive attitude toward job. 7. Demonstrate maturity and emotional stability to manage pressure and burden of work. 8. Stay focused and calm in situations.	Van Der Heijde, C.M.& Vander Heijden, B. I. J.M. (2009)

Table 3.9 (continued)

Variable	Components	Operational definition	Items	Authors
	Ethics, integrity	The extent of work ethics and honesty.	9. Demonstrate work ethics that are aligned with the workplace ethics. 10. Deal with others with honesty and integrity.	Mohd Yusof, H. *et al.* (2012)

3.4.8 Employers' Impression

In this study, Employers' Impression is the moderator variable. The researcher adapted five items from Wayne and Ferris (1990), Bolino and Turnley (1999) and Bolino, Long, and Turnley (2015). The researcher only used five items to measure employers' impression of the engineers' skills at their company. Three of seven items for supervisor focus and two of 12 items for job focus, were rephrased to suit the context of the study. The original and the rephrased five items are shown in Table 3.10 below.

Participants rated their degree of agreement with job focus and supervisor focus statements. Job focus of the engineers is based on behavioural and positive aspects of the engineers' job performance; while supervisor focus is on how supervisors see the engineers as more likeable and largely consist of ingratiatory behaviour.

Table 3.10

Original and Adapted version of Impression management items

Original Version	Adapted version	Measurement
Present yourself to your supervisor as being a friendly person.	The entry-level engineer tries to show that he/she is a friendly person with good attitude and behavior.	Supervisor focus
Try to let your supervisor think that you are responsible for the positive events occurring in your work group	The entry-level engineer tries to let your think that he/she is responsible for the positive events that occur in the work group.	
Let your supervisor know that you try to do a good job in your work	The entry-level engineer tries to show you that he/she tries to do a good job with high quality in your company.	
Create the impression that you are a "good" person to your supervisor	The entry-level engineer tries to impress you that he/she is a "good" worker.	Job focus
Play up the value of a positive event that you have taken credit for.	The entry-level engineer shows the value of a positive event that you have taken the credit for.	

Respondents rated their views using a five-point Likert scale, where, 1 = highly not satisfied and 5 = highly satisfied. Table 3.11 shows the Employers' Impression items used in this study.

Table 3.11

Employers' Impression Items

Variable	Components	Operational definition	Items	Authors
Employers' Impression	Supervisor focus and job focus	Accentuate positive aspects, Ingratiate behaviour	1. The entry-level engineer tries to show that he/she is a friendly person with good attitude and behavior.	Wayne& Ferris (1990)
			1. The entry-level engineer tries to let your think that he/she is responsible for the positive events that occur in the work group. 2. The entry-level engineer tries to show you that he/she tries to do a good job with high quality in your company. 3. The entry-level engineer tries to impress you that he/she is a "good" worker. 4. The entry-level engineer shows the value of a positive event that you have taken the credit for.	Bolino & Turnley (1999)

Overall, the operational definitions of the items were adapted and modified according to the latest situation and environment to suit this study. The main reference to develop the measurements of this questionnaire items was from previous studies, such as Zaharim *et al.* (2010), Yuzainee *et al.* (2012), Hasan *et al.* (2012), Gurcharan, S. G. K. & Garib S. S, K. (2008), Bloom and Saeki (2012), Van Der Heije, C.M. and Vander Heijden, B. I. J.M. (2009) Harvey, L. and Bowes, L. (1998), Wayne, S. & Ferris, G.

(1990), Bolino, M. and Turnley, W. (1990), Bolino, M., Long, D. and Turnley, W. (2015) and from a report MOHE (2012).

3.5 Questionnaires Design

The questionnaire for this study is simple and unbiased words were used so that the respondents would be able to easily understand the questions and provide the best answers from their perception.

To identify the information needed, the questionnaire was divided into three sections, namely Sections I, II, and III as follows: Sections I - instructions, including the rationale for the study and directions for answering the survey; Section II - personal background and demographic information; and Section III 61 employability skills domains representing the six independent variables categorized as Skills Ability (fundamental general skills, engineering skills, teamwork skills, specific personal skills, adaptive skills and self-emotional intelligence skills, moderated by Employers' Impression, and the dependent variable (Employers' Satisfaction) Table 3.12 below presents a summary of the questionnaire according to the sections:-

Table 3.12

Sections of the questionnaire

No	Explanation	Section
1.	Direction for questionnaire answering and rationale of this study.	I
2.	Personal background information (age, study background, race, work experience in that company), and demographic information (position, company size, sector, company background).	II
3.	Engineering graduate skills domain (fundamental general skills, engineering skills, teamwork skills, specific personal skills, adaptive skills, self-emotional intelligence skills), Employers' impression and Employers' Satisfaction.	III

The respondents rated the questions using the Likert scale (five-points) ranging from 1 (highly not satisfied) to 5 (highly satisfied). It took between 20 to 30 minutes for each respondent to complete the instrument.

In Section I, the researcher explained the rationale of this study, the direction to answer the questionnaire and the address of the researcher in case he needed to be contacted. In Section II, the researcher developed 9 questions to obtain the demographic background of all respondents, including of the organization. For this section, two types of scales were chosen (nominal scale and ratio scale). By using nominal scale, five questions on employer's race, gender, and qualification were developed. The next five questions were based on the ratio scale. These questions are about the respondents'

age, the year of the respondents' working in that organization, the year the organization was established, the main business of the organization and the total years of respondents' experience.

In Section III, the researcher also used two types of scales (ordinal scale and interval scale). In this section, the researcher focused on the data regarding the Employers' Satisfaction domain.

Likert scale is commonly used to obtain ratings on a wide variety of surveys (Allen & Seaman, 2007). The Likert scale is to assess attitude, covering a range of responses to a given question or statement. Five categories of response are often utilized, from 1 = strongly disagree to 5 = strongly agree, despite some arguments favouring seven scales or an even number of response categories (Cohen, Manion, & Morrison, 2000).

As stated by Sekaran and Bougie (2009), whether the Likert scale should be ordinal or interval is the subject of much debate. A controversial issue is whether to treat ordinal scales as interval scales (Knapp, 1990). In the ordinal scale, while the points on the scale are ranked in order, the distance between the points is not necessarily constant. In the interval scale, the points on the scale are not only in rank order, but the distance between the points is constant (Scales of Measurement, 2006). The Likert scale is often treated as an interval scale because it calculates average responses to statements (Schmee, Josef, & Jane, 2010).

The response categories in the Likert scale have a rank order and the intervals between values cannot be presumed equal (Jamieson, 2004). As cited by Jamieson (2004), although the intervals between values cannot be presumed equal, Blaikie (2003) pointed out that researchers frequently assume that they are equal. It is hard to exhibit equal intervals in the Likert scale, but it is often assumed equal in order to analyse data (Scales of Measurement, 2006).

Several papers (Vickers, 1999; Maurer & Pierce, 1998; Baggaley & Hull, 1983) showed that the Likert scale could be analysed effectively as an interval scale. Researchers who analysed data using the Likert scale as though it is an interval scale, include those who have published in prestigious, peer-reviewed journals, illustrating that this practice is widespread and not limited to those whose research is frivolous or unimportant (Jamieson, 2004).

Therefore, it is safe to assume that the Likert-type categories comprise the interval level of measurements (Jamieson, 2004). This is supported by Sekaran and Bougie (2009) who stated that the Likert scale is generally treated as an interval scale. Given that, in this study, the researcher treated the Likert scale as falling within the interval scale of measurements.

In this study, the scale for skills satisfaction ranges from 1= highly not satisfied to 5 = highly satisfied. These five items of the engineering skills domain asks participants regarding Employers' Satisfaction based on several points of view.

3.6 Pilot test

It is beneficial to conduct a pilot study prior to the main one (Saunders, Lewis, and Thornhill, 2009). A pilot study, not regarded as a pre-test, is used more formatively to assist in forming important questions (Yin, 1994). The instrument is tested and checked on small samples in the pilot study.

A pilot study is conducted to ensure all necessary modifications on the questions can be made so that the questionnaires will eventually be error-free. Sekaran (2000) stated that a pilot study is conducted to modify the instrument before the main study. The validity reliability, and viability of the research instrument can be determined as well as adjusting the time factor in executing the main study.

The pilot test was held at an industrial round table meeting at the Universiti Teknikal Malaysia Melaka in April 2016. The questionnaires were distributed to 30 manufacturing company representatives. No changes were made to the instrument. The results of Cronbach's Alpha for reliability are reported in Table 3.13. All the variables ranged from .70 to .94, which showed satisfactory reliability values.

Table 3.13

Cronbach's Alpha for each research measure from the pilot study (n = 30)

No. of items	Variable	Cronbach's Alpha
8	Fundamental general skills	.84
11	Engineering skills	.94
11	Teamwork skills	.91
14	Specific Personal skills	.95
7	Adaptive skills	.79
10	Self-Emotional intelligence skills	.93
5	Employers' Impression	.74
5	Employers' Satisfaction	.91

3.7 Data Collection Procedure

A questionnaire is distributed through various means like internet or fax, self-administered, telephone, postal, and google form; it often subjects to researcher's choice, as well as cost, time constraints, potential response rate and other important criteria, (Frazer & Lawley, 2000). This study used personal approach through face to face and the completed questionnaires were collected. This approach are beneficial because it yields high response rate, decreases interviewer bias and increases personal contact (Oppenheim, 2000). It also allows researchers to give brief explanations in

case of vague instruction. Besides, completed questionnaires can be collected immediately (Hayes, 2000; Sekaran, 2003).

After the Questionnaire was pilot-tested, a primary data collection started. An official letter to carry out a survey was first obtained from the College of Business (COB), UUM, that the researcher is an active postgraduate student who gather data from manufacturing companies (See Appendix A). The task of collecting data was carried out in stages within a period of two months, beginning from **15 October 2016 until 15 December 2016**. Participants were assured of the confidentiality of the information provided and the inputs were only used for this study purposes. 30 minutes were allotted for them to answer the questionnaires. However, some questionnaires had to be left behind to the company representatives and the researcher came back to collect them later.

3.8 Techniques of data analysis

Statistical Package for the Social Sciences (SPSS) Version 22 was used to analyse data. All related categories were coded prior to entering the data into the SPSS. Continuous variables were entered into the computer as given in the questionnaire. First and foremost, the frequency test was to determine the demographic factors variances. Then, several tests were performed to obtain the minimum, maximum, mean and standard deviation (SD) values for the demographic section. These tests were conducted via descriptive analysis.

3.8.1 Data Screening and Preliminary Analysis

Data is check for clerical error before the statistical data analysis been carried out. This study employed a series of data screening method to check for the normality, homoscedasticity, linearity and Multicollinearity. This initial screening is important for the distribution of the data and the selected sample size has an effect on the data analysis techniques chosen, and the statistical testthat can be carried out (Bryne, 2010).

3.8.1.1 assumption of Normality

It is important to check for the assumptions of normality before regression analysis been carried out. The variable, if not normally distributed, may distort the result by skewing the data distort the relationship between the variables, and the significance of test outcomes (Hulland, 1999). It is through correcting for the normality of data that the probability of committing Type I and Type II errors is reduced significantly and thus increasing the accuracy of the research output (Bryne, 2010). This study therefore has to check for the abnormality in the data by cleaning it, through first finding out the Z scores of items and then transforming them into "cdfnorm" in SPSS 22.

3.8.1.2 Assumption of Homoscedasticity

Homoscedasticity is a term used in regression analysis meaning that the variance off the entire variable, especially dependent variable (DV) is the same for all the data used

in the study. In others words, the variance for DV is similar across the span of variables for the IV. To check the homoscedasticity of the variable in this study, Scatter plot have been used.

3.8.1.3 Assumption of Linearity Relationship

For the standard multiple regression to estimate the relationship between the various variable, it is important that the relationship between the dependent and independent variable be linear. These assumptions of linearity are especially important in social science research, where the non-linear relationship an ever more common. Moreover, in case the relationship between the dependent and independent variables is non-linear, there is a risk that the outcomes of regression analysis will underestimate the true relationship between the variables. According to Hair et al. (2010) there are two risks attached when the result are underestimated:

i. There a chances of Type II errors for the independents variables (IV).

ii. There are increased chances of Type I errors for multiple regression where there is over-estimation and other independent variables share variances with that IV.

More important, researchers such Berry and Feldman (1985), Cohen (1983), Pedhazur (1997) have suggested three ways to detect non-linearity as follow:

i. The first method as proposed is that there should be previous research to support the current analysis.

ii. The second method is to detect through residual plot examination. The plot used may indicate a linear or curvilinear relationship between the variables.

iii. The third method is to run regressions analysis continuously to routine check for curvilinear relationship.

3.8.1.4 Multicollinearity

Multicollinearity refer to the relationship among the various independent variables for the study. When the IV are highly correlated, especially having r=.90 or above, they are said to have multicollinearity (Hair et al, 2010). Multiple regressions modelling do not tolerate multicollinearity and do not contribute to a fit regression model.

3.8.2 Factor Analysis

The next procedure was to run factor analysis. This was to ensure that the instrument for the actual study is accurate and measures the concepts of the study. According to Zickmund (2005), construct validity via the factor analysis approach is to ensure that the measures fit the theories.

Prior to testing the relationships between variables measured in the study, factor analysis was to determine the underlying dimensions of each construct. Factor analysis produces descriptive summaries of data matrices, which helps to trace meaningful patterns among the set of variables (Dess, Lumpkin, & Covin, 1997). If the number of variables exceeds 30, principle components analysis (PCA) is the most frequently used approach (Cooper & Schindler, 2001). Besides, varimax rotation provides a clearer separation of factors (Hair *et al.* 1998). Items under each construct that had been subjected to reliability and factor analyses were utilized in the study.

The factor analysis results are reported in the next chapter. After factor analysis was done, the researcher continued the procedure and conducted the reliability test. Reliability coefficients were computed for the dependant variable [(Employer Satisfaction (ES)]; the independent variables [Fundamental General Skills (FGS), Engineering Skills (EgS), Teamwork Skill (TS), Specific Personal Skills (SPS), Adaptive Skills (AS) and Self-emotional Intelligence Skills (SEIS)], as well as for the moderating variable [Employer Impression (EI)].Reliability was operationalized as internal consistency, which is indicative of the homogeneity of the items in the construct measurement.

Reliability is the extent to which a variable or a set of variables is consistent in what it is intended to measure (Hair *et al.* 1998). Cronbach's Alpha provides the recommended measure of the internal consistency of a set of items (Sekaran, 2003).The most commonly used reliability coefficients is Cronbach's Alpha (Coakes & Steed, 2001).

In general, more than .70 are required to reach the acceptable reliability lower limit value of Cronbach's Alpha. Nevertheless, 0.60 of Cronbach's Alpha could also be accepted (Hair *et al.* 1998).

3.8.3 Multiple Regression Analysis

Multiple regressions analysis is to measure the relationship between independent and the dependent variables. The multiple regressions procedure was run in order to assess the hypotheses. In other words, this procedure was done to test the independent variables predictive power. Multiple regressions was utilized to test the research hypotheses relating to the main effect of each variable. Multiple regressions was run for each rating of the independent variables on the dependent variable. Aiken and West (1991) Cohen and Cohen (1983), and Stone-Romero and Hollenbeck (1984), suggested that multiple regressions be used in studies concerning the moderating effects detection. Baron and Kenney (1986) suggested multiple regressions to measure a moderating effect.

In addition, in order to interpret the value between 0 (no relationship) and 1 (perfect relationship), Cohen's (1988) suggestion was followed. When the value of R= $\pm$ 0.1 to $\pm$ 0.29, the relationship is said to be small. The relationship is considered medium when R value is between $\pm$ 0.3 to $\pm$ 0.49 and the strength is large when R value is between $\pm$ 0.50 and above.

Multiple regressions analysis is to determine the relationship between a single dependent (criterion) variable and several independent variables (predictor). The objective of multiple regressions analysis is to use the independent variables whose values are known to predict the single dependent value selected by the researcher. Each independent variable is weighted by the regressions analysis procedure to ensure maximal prediction from the set of independent variables. The set of weighted independent variables from the regression variate, linear combination of the independent variables that best predict the dependent variable (Hair, Jr., Black, Babin, & Anderson, 2010).

Furthermore, multiple regressions is essential because it can forecast future outcomes. The goal of performing multiple regressions was to ascertain the independent variables predictive power (FGS, EgS, TS, SPS, AS, SEIS) on the dependent variable (ES) moderated by Employers' Impression.

3.8.4 Test of moderation

A moderator is an independent variable that influences the strength and/or direction of association between another independent variable and an outcome variable. A moderator variable may initially be analysed in a multiple regressions model as one of the independent variables. Nevertheless, subsequent steps in the analysis might unfold two distinct regression slopes in the data that depend on the moderator value. The moderator interacts with the independent variable so that the independent variables'

association with the outcome variable is stronger or weaker at different levels of the moderator variable. In other words, the association of the independent variable with the outcome variable depends on the (or level) moderator variable value (Cohen, 1988).

3.9 Chapter summary

In summary, this chapter covers several important topics in relation to research methodology. It details the process of obtaining samples of organizations, design of the questionnaire, selection of the respondents, research materials, and the survey procedure. This chapter also discusses several analyses adoption, such as correlation and regressions analyses to test the research hypotheses. The data analysis and research findings of this study are reported in the next chapter.

CHAPTER4

DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter is to analyze and report the findings of this study. It discusses the analyses conducted and empirical results of the research hypotheses. The first section presents the response rate and validity of this study. Then, the following section describes the Exploratory Factor Analysis (EFA) and reliability analysis of all variables in this study. The third section outlines the hypotheses statements in this study while the fourth section describes the respondents followed by the descriptive analysis of variables used in this study. Next, the results regarding the inter-correlations between variables are presented. The sixth section presents the report from the regression analyses followed by the report from the post-hoc analyses. A summary of the results of the hypotheses is included.

4.2 Response rate

The sample of this study consists of 210 responses received from 477 manufacturing companies located in Pulau Pinang, Melaka and Negeri Sembilan, according to the FMM, 2015 directory. The questionnaire was distributed to only the senior managers of the company.

Fifteen questionnaires were rejected due to incomplete answers and a few respondents gave excuses that they were too busy to participate in this study. Some senior managers returned blank questionnaires. Sadly, some companies did not even want to participate in this survey. Due to these circumstances, only 195 questionnaires were found acceptable for this study's purposes for further investigation.

Based on the large-scale data collection, the response rate for this study is 41%. According to Cohen *et al.* (2007), the response rate for self-data collection, which is more than 40%, is considered as good; therefore, it is considered adequate for this study. Table 4.1 illustrates the total distribution and collection of questionnaires from all participating companies in Pulau Pinang, Melaka and Negeri Sembilan. During the data collection process, the representative was told that the respondent's identity would not be revealed in any report of the results. However, the list of participating organizations would be disclosed. The total number of usable questionnaires for analysis, i.e., 195, are greater than what is suggested by Krejcie and Morgan (1970) as cited by Sekaran (2003).

Table 4.1

Distribution and Collection of Questionnaires

States	Distribution (S=477)	Collection	Percentage %
Melaka	108	55	23

Table 4.1 (continued)

States	Distribution (S=477)	Collection	Percentage %
Negeri Sembilan	81	40	17
Pulau Pinang	288	143	60
	477	**238**	**100 %**

4.3 Content validity

In order to validate the instrument used in this study, content validity was conducted for questionnaire items through several discussions, which were held to ensure that the original meaning is maintained.

The researcher obtained specific feedback from manufacturing representatives, senior officers and colleagues. The independent reviewers involved academicians and professionals from industry and senior academicians from the university. They were requested to complete the questionnaires and can give comment on the items, suggest changes, refine items and state their understanding of each item. They were also requested to evaluate the questionnaire for clarity, comment on wording, sequencing and timing.

After reviewing, the questionnaire was pilot-tested. In this study, a convenient sample of industry representatives was used for the pilot-test to enhance the instrument's

validity and clarity instrument before the actual data collection process began. The pilot test results are illustrated in Table 4.2 that indicate the reliability analysis results for 30 respondents from manufacturing companies. According to Bollen (1989), among the four most common techniques for assessing the reliability of constructs, the most widely used internal consistency reliability test is Cronbach's alpha (Cronbach, 1951) .70 or more are acceptable in exploratory research (Nunally cited in Tharenou *et al.* 2007).

4.4 Construct validity and reliability

This section presents the background information about the psychometric properties of the instruments of the study. The psychometric properties of the instrument used in this study were evaluated via construct validity and reliability using IBM SPSS 22 to determine Cronbach's Alpha values. According to Hair *et al.* (1998), the validity of the instrument in the survey indicates an indicator reliability to test accurately the construct of the study; while reliability indicates the extent to which a set of two or more indicators are consistent in their measurement of a construct.

Validity and reliability are different but closely related. Although most of the measures used in the present study were adapted from established scales, EFA and reliability tests were conducted on each variable as shown in Table 4.2 below. This was to ensure that the scales are suitable and relevant in the Malaysian context.

Table 4.2

Reliability Test

Constructs	Cronbach's Alpha
Fundamental general skills	.84
Engineering skills	.98
Teamwork skills	.91
Specific personal skills	.95
Adaptive skills	.79
Self-emotional intelligence skills	.93
Employers' satisfaction	.91
Employers' Impression	.74

4.5 Demographic profile

Manufacturing employers in Pulau Pinang, Melaka and Negeri Sembilan in Malaysia are the target population for this study. A total of 195 out of 477 employers answered the questionnaires. The samples of this study are categorized into 9 demographic aspects: age, gender, race, field of study, years of working, current role, size of company, employees hired in 2015 and sector of the company.

Table 4.3 depicts the of the respondents' gender where the employers are mostly female (62.1 percent) while male is 37.9 percent. Additionally, Table 4.4 shows that the race of employers is Malay (40.8 percent), Chinese (35.I percent) and Indian (I6.6 percent). Most of them fall between the age cohort of 31 – 40 years (47.7 per- cent), followed by 25 – 30 years (27.7 percent) and those between 41 – 50 (22.1 percent),

and followed by those who are more than 51 years old (2.4 percent) as illustrated in Table 4.5.

Table 4.3

Gender of Respondents

Gender	Frequency	Percentage %
Male	74	37.9
Female	121	62.1

N = 195

Table 4.4

Race of Respondents

Race	Frequency	Percentage %
Malay	86	40.8
Indian	35	16.6
Chinese	74	35.1

N = 195

Table 4.5

Age of Respondents

Age (years)	Frequency	Percentage %
25-30	54	27.7
31-40	93	47.7
41-50	43	22.1
>51	5	2.4

N = 195

Most respondents are in the management area of study (54.4 percent) followed by social science (20.0 percent), engineering (16.4 per cent), economics (5.6 per cent) and other fields (3.6 per- cent) as shown in Table 4.6. Meanwhile, Table 4.7 illustrates the years of working in the same company, with the longest being 6 – 10 years (49.2 percent), followed by 1 – 5 years (30.3 per cent), 11 – 15 years (18.5 percent) and 16 years and above (2.1 percent).

Table 4.6

Respondents' Education Background

Education	Frequency	Percentage %
Engineering	32	16.4
Social Science	39	20.0
Economics	11	5.6
Management	106	54.4
Others	7	3.6

N = 195

Table 4.7

Overall Length of Working Experience

Period	Frequency	Percentage %
1 to 5 years	59	30.3
6 to 10 years	96	49.2
11 to 15 years	36	18.5
16 years and above	4	2.1

N = 195

Furthermore, Table 4.8 shows the current position of the respondents: Production Manager (47.7 percent) followed by Director (22.6 percent), Manager (21.0 percent), Executive Director (7.2 percent) and Chief Executive Officer (1.5 percent).

Table 4.8

Current Position of Respondents

Position	Frequency	Percentage %
Chief Executive Officer	3	1.5
Executive Director	14	7.2
Director	44	22.6
Production manager	93	47.7
Manager	41	21.0

N = 195

Table 4.9 shows the size of the respondents' company: medium between 100 and 500 employees (52.8 percent) followed by large of more than 500 employees (26.2 percent) and small at under 100 employees (20.5 percent).

Table 4.9

Size of Company

Business Size (Employees)	Frequency	Percentage %
Large	51	26.2
Medium	103	52.8
Small	40	20.5

N = 195

The organizations hired engineers in 2015; the lowest is less than 10 employees (17.4 percent) followed by the highest at 11 to 20 employees (31.8 per- cent) and 21 to 30 employees (30.3 percent), and more than 40 employees (20.5 percent) as shown in Table 4.10.

Table 4.10

Employees Hired by Companies in 2015

Employees	Frequency	Percentage %
< 10	34	17.4
11 - 20 Employees	62	31.8
21 - 30 Employees	59	30.3
> 40	40	20.5

N = 195

The majority of companies involved in this study are from the manufacturing sector (64.6 percent), followed by Electronic Industries (16.9 percent), IT (7.7 percent) Food Processing (6.7 percent), Paper Products (5 percent), others (5 percent), and Oil and Gas (1.0 percent) as indicated in Table 4.11.

Table 4.11

Sector of the Company

Industry Background	Frequency	Percentage %
Oil and Gas	2	1.0
Electronic Industries	33	16.9

Table 4.11 (continued)

Industry Background	Frequency	Percentage %
IT	15	7.7
Infrastructure	4	2.1
Food Processing	13	6.7
Manufacturing (machine setup, semiconductor, fabrication, industrial production, high tech. etc.)	126	64.6
Paper Products	1	.5
Others	1	.5

N = 195

4.6 Descriptive Analysis

This section presents each variable descriptive statistics. Descriptive statistics were used for all dimensions in the employers' satisfaction domain. The data were widely scattered around the mean. Besides, how far individuals' responses to questions vary or deviate from the mean indicates standard deviation.

4.6.1 Analysis of Fundamental General Skills, Specific Personal Skills, Engineering Skills, Teamwork Skills, Adaptive Skills, Self-Emotional Intelligences Skills, Employers' Satisfaction and Employers' Impression

Table 4.12 presents the descriptive statistics for Fundamental General Skills (FGS) of the Employers' Satisfaction. A majority of the respondents agree with the statements representing FGS, as the mean for each item ranges from 3.7 to 4.04, which indicates that they agree with the statements. The highest mean is FGS2 where the respondents agree on the statement of "demonstrate high communication skills". Meanwhile, the statement, "knowledge of contemporary issues" has the lowest mean of 3.71.

Table 4.12

Descriptive Statistics of Fundamental General Skills

Code	Items	N	Mean	Standard Deviation
FGS2	Demonstrate high communication skills (English)	195	4.04	0.68
FGS7	Demonstrate basic computer soft skills for simple tasks (word processing, such as formatting, inserting graphics into documents, etc.)	195	4.01	0.71
FGS6	Use different computer applications (Spreadsheets, such as entering data, formulae, copying, linking, etc.)	195	4.00	0.79
FGS5	Understand information presented in a variety of forms (Graphs, charts, diagrams, etc.)	195	3.95	0.77
FGS8	Show a good personality in terms of dressing and style	195	3.84	0.79
FGSl	Demonstrate listening skills	195	3.82	0.77
FGS3	Able to communicate in other languages (English, Mandarin, etc.)	195	3.80	0.84
FGS4	Knowledge of contemporary issues	195	3.71	0.91
	Valid N (listwise)	**195**		

The descriptive statistics for Specific Personal Skills (SPS) of the Employers' Satisfaction model is shown in Table 4.13. The mean values range from 3.8 to 4.2, thus indicating that respondents agree that SPS is required for employers' satisfaction. The highest mean is SPS13 with 4.22 of mean value and the lowest is SPS5 with 3.88 of mean value.

Table 4.13
Descriptive statistics of Specific Personal Skills

Code	Items	N	Mean	Standard Deviation
SPS13	Demonstrate punctuality at work	195	4.22	0.62
SPS1	Practice time management in completing assigned tasks	195	4.18	0.66
SPS9	Identify new approaches to solve problems (Creativity)	195	4.17	0.67
SPS12	Display positive attitude towards work	195	4.17	0.63
SPS6	Learn from previous mistakes	195	4.16	0.67
SPS10	Demonstrate ability to work independently (Reliability)	195	4.12	0.65
SPS8	Graduate skills are in accordance with this company's needs	195	4.09	0.71
SPS14	Use appropriate occupational safety practices	195	4.09	0.69
SPS3	Show an ability to work under pressure	195	4.05	0.66
SPS11	Maintain self-control (Maturity)	195	4.05	0.64
SPS2	Demonstrate accountability to work under pressure	195	4.01	0.62
SPS4	Commitment to life-long-learning	195	3.97	0.75
SPS7	Identify entrepreneurship skills	195	3.94	0.78
SPS5	Ability to balance work and personal life	195	3.88	0.75
	Valid N (listwise)	**195**		

Meanwhile, Table 4.14 presents the descriptive statistics for engineering skills (EgS) from the Employers' Satisfaction model. The results show the mean values range from 3.8 to 4.05; indicating that a majority of participants agree with engineering skills

statements in the questionnaire. From the result, most respondents indicate that "ability to apply skills, access to and knowledge of science and engineering fundamentals" (EgS 8) has the highest mean of 4.05. "Skill of using engineering tools effectively (Other than Computer)" (EgS 2) has the lowest mean of 3.81.

Table 4.14

Descriptive statistics of Engineering Skills

Code	Items	N	Mean	Standard Deviation
EgS8	Ability to apply skills, access to and knowledge of science and engineering fundamentals	195	4.05	0.78
EgS6	Demonstrate knowledge in and understanding of engineering systems	195	3.99	0.75
EgS5	Ability to design and conduct experiments, analyze and interpret data	195	3.96	0.81
EgS7	Ability to analyze engineering design	195	3.96	0.76
EgS4	Ability to identify, formulate and solve technical/engineering problems	195	3.95	0.76
EgS10	Ability to use techniques for engineering practices in work	195	3.95	0.78
EgS9	Ability to apply knowledge in multidisciplinary engineering	195	3.9	0.79
EgS3	Ability to design a system, component or process to meet desired needs	195	3.88	0.75
EgS11	Demonstrate ability to use modern/latest engineering software	195	3.83	0.78
EgS1	Ability to apply knowledge of mathematics, science and engineering	195	3.82	0.62
EgS2	Skill of using engineering tools effectively (Other than Computer)	195	3.81	0.65
	Valid N (listwise)	**195**		

Table 4.15 presents the descriptive statistics for teamwork skills (TS) of the Employers' Satisfaction model. The results show the mean values range from 3.98 to

4.2, which indicates that teamwork skills are desired for an employee in the organization. From the result, most respondents indicate that "understand and align with business conducted" (TS1) has the highest mean of 4.23, and the statement, "respond to constructive criticism in the group" (TS4) has the lowest mean of 3.98.

Table 4.15

Descriptive statistics of Teamwork Skills

Code	Items	N	Mean	Standard Deviation
TS1	Understand and align with business conducted	195	4.23	0.637
TS9	Function efficiently in a group as a team member	195	4.19	0.698
TS6	Contribute to the team by sharing information and knowledge	195	4.18	0.623
TS11	Function effectively as an individual and worker	195	4.18	0.671
TS8	Good interpersonal relationship in team	195	4.17	0.64
TS7	Demonstrate highly efficient leadership when needed	195	4.16	0.706
TS3	Demonstrate appropriate skills in interacting with others (Supervisors, customers, colleagues and others)	195	4.14	0.671
TS2	Understand the role in a group	195	4.13	0.652
TS5	Accept differences and diversity of individuals within the group	195	4.11	0.676
TS10	Accept and provide feedback in a constructive and considerate manner	195	4.08	0.65
TS4	Respond to constructive criticism in the group	195	3.98	0.63
	Valid N (listwise)	**195**		

The descriptive statistics for Adaptive Skills (AS) of the Employers' Satisfaction model is shown in Table 4.16. The mean values range from 3.8 to 4.1, indicating that participants agree that adaptive skills are required for employers' satisfaction. The

highest mean is AS5 with 4.12 of mean value and the lowest is AS2 with 3.84 of mean value.

Table 4.16

Descriptive statistics of Adaptive Skills

Code	Items	N	Mean	Standard Deviation
AS5	A fast learner in learning or doing the job	195	4.12	0.72
AS1	Illustrate individual skills to resolve problems.	195	4.1	0.66
AS6	Demonstrate individual creativity in work and to solve problems	195	3.98	0.66
AS4	Display individual intelligence	195	3.92	0.7
AS3	Show uniqueness in terms of skills, attitude and knowledge	195	3.88	0.68
AS7	Demonstrate high knowledge, skills, attitude and other characteristics (KSAOs)	195	3.86	0.69
AS2	Ability to show different personal skills from other engineers	195	3.84	0.65
	Valid N (listwise)	**195**		

In addition, Table 4.17 presents the descriptive statistics for Self-emotional Intelligence Skills (SEIS) of the Employers' Satisfaction model. The results show the mean values range from 3.99 to 4.18, which indicates that Self-Emotional Intelligence Skills are considered and required for employability in the organization. From the result, most respondents indicate that "Deal with others with honesty and integrity" (SEIS10) has the highest mean of 4.18, and the skill of "Practice ways to resolve conflicts" (SEIS2) has the lowest mean of 3.99.

Table 4.17

Descriptive statistics of Self-Emotional Intelligence skills

Code	Items	N	Mean	Standard Deviation
SEIS10	Deal with others with honesty and integrity	195	4.18	0.663
SEIS9	Demonstrate work ethics that are aligned with the workplace ethics	195	4.17	0.642
SEIS6	Show positive attitude toward job	195	4.16	0.689
SEIS8	Stay focused and calm in situations	195	4.15	0.661
SEIS7	Demonstrate maturity and emotional stability to manage pressure and burden of work	195	4.12	0.659
SEISI	Adjust to workplace changes (Flexibility)	195	4.10	0.583
SEIS3	Display evidence of self-esteem, confidence and self-motivation	195	4.08	0.65
SEIS4	Show willingness to be relocated, if needed.	195	4.08	0.699
SEIS5	Show stability in terms of emotion, attitude and style	195	4.08	0.688
SEIS2	Practice ways to resolve conflicts	195	3.99	0.689
	Valid N (listwise)	**195**		

The descriptive statistics for Employers' Satisfaction (ES) is shown in Table 4.18. The mean values range from 3.82 to 3.89, which indicates that respondents agree that naturally required Employer satisfaction. The highest mean is ES1 with mean value of 3.89 and the lowest is ES3 with the mean value of 3.82.

Table 4.18

Descriptive statistics of Employers' Satisfaction

Code	Items	N	Mean	Standard Deviation
ES1	Overall, are you satisfied with entry-level engineers' skills who you hired (new engineers who have less than three years of experience)?	195	3.89	0.742

Table 4.18 (continued)

Code	Items	N	Mean	Standard Deviation
ES2	Do you think entry-level engineers who your company has hired are fully equipped with the necessary skills?	195	3.87	0.676
ES4	Entry-level engineers who have been hired by your company are well trained by Malaysian public HEIs	195	3.87	0.741
ES5	Overall, all entry-level engineers who have been hired by your company have been fully moulded according to the manufacturing company's needs.	195	3.83	0.718
ES3	Overall, entry-level engineers who your company has hired are very skilful and highly talented in engineering work.	195	3.82	0.706
	Valid N (listwise)	**195**		

The descriptive statistics for Employers' Impression (EI) of the Employers' Satisfaction model is shown in Table 4.19. The highest mean is EI3 with value of 4.05, which indicates all the respondents are satisfied with the engineers' skills in their company. The lowest mean is 3.81 for EI2, which indicates the engineers in their company have been equipped with the necessary skills.

Table 4.19

Descriptive statistics of Employers' Impression

Code	Items	N	Mean	Standard Deviation
EI1	The entry-level engineer tries to show you that he/she is a friendly person with good attitude and behavior.	195	3.89	.742

Table 4.19 (continued)

Code	Items	N	Mean	Standard Deviation
EI2	The entry-level engineer tries to let you think that he/she is responsible for the positive events that occur in the work group.	195	3.81	.645
EI3	The entry-level engineer tries to show you that he/she tries to do a good job with high quality in your company.	195	4.05	.782
EI4	The entry-level engineer tries to impress you that he/she is a "good" worker.	195	3.83	.778
EI5	The entry-level engineer shows the value of a positive event that you have taken the credit for.	195	3.87	.741
	Valid N (listwise)	**195**		

4.7 Test for response bias

Armstrong and Overton's (1977) extrapolation was used to measure non-response bias. This method was utilized to test non-response bias by measuring early and late respondents' significant differences. Table 4.20 summarizes the results of non-response bias assessments. To ensure the data adequacy, the early responses are respondents who completed the survey within a few days after soft invitation reminder was sent. Late respondents are those who filled in the questionnaire within one to two weeks after email reminders were sent.

Table 4.20

Response Bias Assessment

Constructs	Early respondents (n=85)	Late respondents (n=110)	*t*-value	Significance (2-tailed)
Fundamental general skills	3.86	3.92	-.706	.481
Engineering skills	4.04	4.11	-1.242	.216
Teamwork skills	3.90	3.93	-.268	.789
Specific personal skills	4.10	4.18	-1.282	.201
Adaptive skills	3.98	3.94	.640	.523
Self-emotional intelligence skills	4.13	4.10	.516	.606
Employers' Satisfaction	3.94	3.79	1.710	.089
Employers' Impression	3.88	3.89	-.195	.846

79 items in the questionnaire underwent the Independent t-tests. The results yielded there was no significant difference between the two groups with $p > 0.05$. Hence, response bias did not pose a serious problem. A more demanding response bias test includes getting in touch with non-respondents directly to implore few responses for comparison purposes (Mentzer & Flint, 1997). Upon the completion of the data collection, this test was also performed and no significant difference were found between the two groups.

4.8 Data Screening and Assumption

Multivariate techniques and their univariate counterparts are all based on a fundamental set of assumptions representing the requirements of the underlying statistical theory. Although many assumptions or requirements come into play in one or more of the multivariate techniques, four of them potentially affect every univariate and multivariate statistical technique. The assumptions are normality, homoscedasticity, linearity and multicollinearity.

4.8.1 Normality Test Assumption

The first techniques are normality. In order to make valid inferences from regression, the residuals of the regression should follow a normal distribution. The residuals are simply the error terms, or the differences between the observed value of the employer's satisfaction and the predicted value. Normality will examine a normal Predicted Probability (P-P) plot, and able to determine if the residuals are normally distributed. Figure 4.1 indicated the diagonal line and a bunch of little circles and the data is normal. The result of normality is no drastic deviations an accepted.

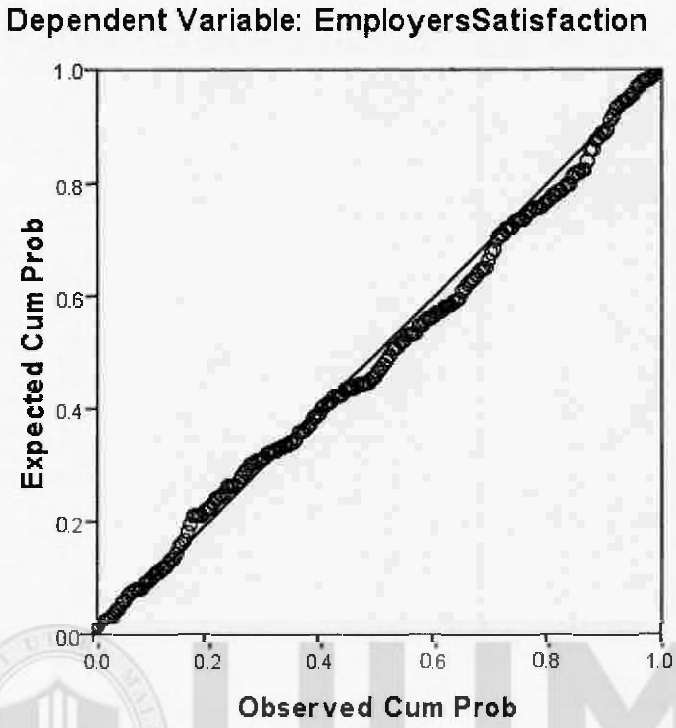

Figure 4.1: Normal P-P Plot of Regression Standardized Residual

4.8.2 Homoscedasticity Test Assumption

The second assumptions are homoscedasticity. Homoscedasticity refers to whether these residuals are equally distributed, or whether they tend to bunch together at some values and at other values, spread far apart. In the context of *t*-tests and ANOVAs, it may catch this same concept referred to as equality of variances or homogeneity of variances. If the data is homoscedastic if it looks somewhat like a shotgun blast of randomly distributed data. The opposite of homoscedasticity is heteroscedasticity, where it might find a cone or fan shape in your data.

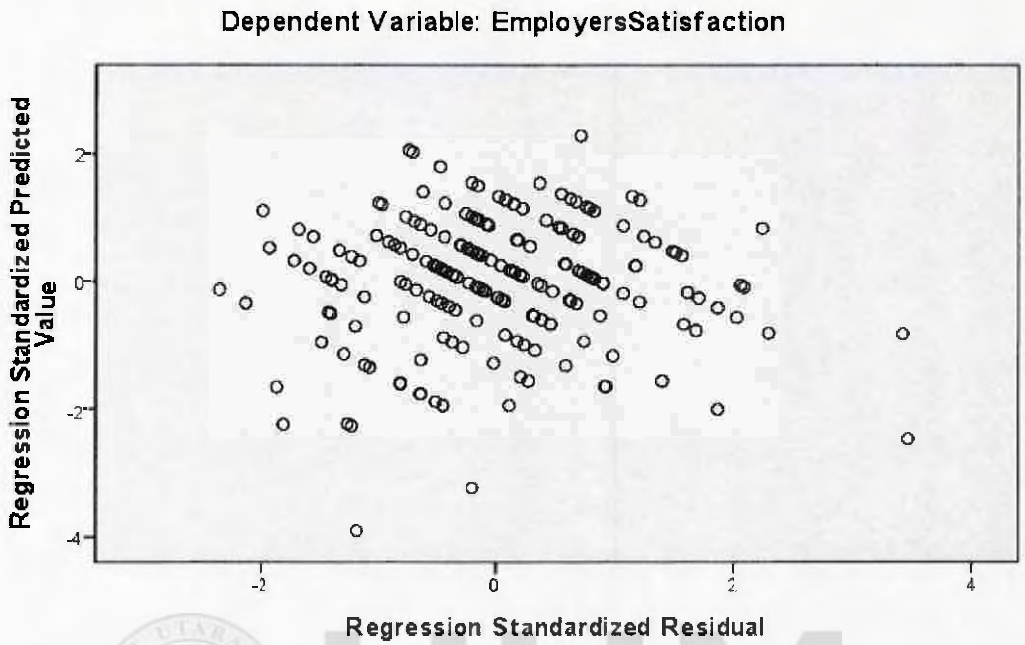

Figure 4.2 : Scatterplot

Based on the Figure 4.2, above, the scatterplot of the residuals will appear center of the normal P-P plot in the output. Its look like shot it out of a shotgun and it does not have an obvious pattern, there are points equally distributed above and below zero on the X axis and to the left and right of zero on the Y axis.

4.8.3 Linearity Test Assumption

The third steps are linearity. The linearity of the relationship between the dependent and independent variables represents the way changes in the dependent variable are associated with the independent variables, namely, that there is a straight-line

relationship between the independent variables and dependent variable. If the residuals are normally distributed and homoscedastic, the result of linearity also will follow a normal data. This assumption is essential as regression analysis only tests for a linear relationship between the independent variables and dependent variable.

If the assumptions of regression analysis are met, then the errors associated with one variable are not correlated with the errors of any other variables. Independence of residuals can be examined via the Durbin-Watson statistic, which tests for correlations between errors. Specifically, it tests whether adjacent residuals are correlated. The results indicated in Table 4.21, as a rule of thumb, researchers suggest that Durbin-Watson test values less than 1 or greater than 3 are definitely cause of concern, however, values closer to 2 indicate that the residuals are acceptable.

Table 4.21

Linearity test of Durbin-Watson

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.731[a]	.535	.520	.35711	1.957

a. Predictors: (Constant), Self-Emotional Intelligence Skills, Fundamental General Skills, Adaptive Skills, Engineering Skills, Interpersonal Skills, Behavioral Skills

b. Dependent Variable: Employers Satisfaction

4.8.4 Multicollinearity Test Assumption

The final assumptions are multicollinearity. Multicollinearity is the existence of a strong linear relationship among variables, and prevents the effect of each variable being identified. Researchers examining the variable inflation factor (VIF) and tolerance level (TOL) as a second tool for multicollinearity diagnostics. VIF represents the increase in variance that exists due to collinearities and interrelationships among the variables. VIFs larger than 10 indicate strong multicollinearity and as a rule of thumb VIFs should be less than 5.0. The Table below indicate the results are acceptable for multicollinearity assumptions when the VIF is between 1.09 to 1.98, which is below than 5.0.

Table 4.22

Multicollinearity

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.293	.332		.884	.378		
	Fundamental General Skills	.188	.050	.216	3.766	.000	.753	1.327
	Engineering Skills	.499	.049	.567	10.141	.000	.793	1.261
	Interpersonal Skills	.064	.056	.067	1.141	.255	.715	1.399
	Behavioral Skills	-.007	.098	-.005	-.071	.944	.505	1.981
	Adaptive Skills	.093	.046	.105	2.024	.044	.915	1.093
	Self-Emotional Intelligence Skills	.078	.063	.068	1.227	.221	.817	1.224

a. Dependent Variable: Employers Satisfaction

4.9 Exploratory Factor Analysis (EFA)

Following the four steps of assumptions, the results indicated all the data is normal and accepted to run the exploratory factor analysis (EFA).

4.9.1 EFA for Employers' Satisfaction Model

To ensure validity for each of the constructs of employers' satisfaction in the context of satisfaction among the employers of manufacturing firms in Malaysia, EFA was performed. Each of the independent constructs (i.e., fundamental general skills, specific personal skills, engineering skills, teamwork skills, adaptive skills and self-emotional intelligence skills) was validated, as well as the dependent construct (i.e., employers' satisfaction). The moderating construct, employers' impression, was also tested. Initial factor extractions were performed based on eigenvalues greater than 1 using principal component method in IBM SPSS 22 with individual item factor loadings of 0.40 or more (Hair *et al.* 2006). Factor loadings should be greater than 0.50, with greater than 0.70 being a stricter criterion (Fornell, 1982).

When new item scales are developed, it is common to find some items with loadings below 0.70 (Hulland, 1999). The initial loadings of EFA analysis are shown in Table 4.23 along with the initial Kaiser-Meyer-Olkin (KMO) measure. The KMO measure

indicates that all measures of sampling adequacy above the acceptable level of 0.50 determines the appropriateness for factor analysis (Rahman *et al.* 2011).

The first EFA analysis procedure of this study was performed using 195 samples obtained in this study utilizing PCA extraction and varimax rotation techniques. This procedure resulted in the extraction of 16 factors accounting for eigenvalue above 1 and the factor loadings in the range of .24 to .85.

To analyze the suitability of running factor analysis, the KMO and Bartlett's test of sphericity were performed. The results yielded that the matrix is factorable with KMO test value of .78 and Bartlett's test of sphericity at $\chi 2$ ($df = 2145$, $n = 195$) = 8016.41, $p < .000$.

Based on result shown in Table 4.23, five additional groups were created with only two or three items per group; some items were mixed with the other items in the same group and the items below the factor loading of 0.4. Thus, this study decided to remove all 11 items of TS9, TS8, SEIS4, TS6, AS1, AS2, TS11, TS10, TS7, TS5 and SPS6 completely and EFA was conducted again.

Table 4.23

Exploratory factor analysis for Employers' Satisfaction items 1

Items	Factor															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
EgS2	0.76															
EgS4	0.73															
EgS9	0.73															
EgS7	0.72															
EgS8	0.72															
EgS10	0.72															
EgS3	0.72															
EgS1	0.71															
EgS11	0.70															
EgS6	0.67															
EgS6	0.67															
EgS5	0.76															
FGS6		0.74														
FGS3		0.73														
FGS5		0.73														
FGS7		0.69														
FGS4		0.68														
FGS8		0.63														
FGS2		0.57														
FGS1		0.50														

Table 4.23 (continued)

Items	Factor															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ES3			0.85													
ES4			0.84													
ES2			0.79													
ES5			0.77													
ES1			0.76													
SEIS10				0.73												
SEIS9				0.72												
SEIS8				0.71												
SEIS7				0.70												
SEIS6				0.44												
AS5					0.71											
AS4					0.68											
AS6					0.66											
AS7					0.60											
AS3					0.60											
SEIS3						0.79										
SEIS2						0.75										
SEIS1						0.70										
SEIS5						0.52										
SPS2							0.77									
SPS1							0.74									
SPS3							0.67									

Table 4.23 (continued)

Items	Factor															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SPS9								0.73								
SPS10								0.69								
SPS8								0.68								
TS2									0.72							
TS3									0.69							
TS4									0.67							
TS1									0.58							
SPS5										0.78						
SPS4										0.63						
SPS7										0.50						
SPS14											0.77					
SPS13											0.73					
SPS11											0.51					
SPS12											0.46					
TS9												*0.78*				
TS8												*0.63*				
SEIS4													*0.57*			
TS6													*0.55*			
AS1														*0.71*		
AS2														*0.61*		

Table 4.23 (continued)

Items	Factor															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TS11															*0.74*	
TS10															*0.41*	
TS7																*0.68*
TS5																*0.24*
SPS6																*0.26*

The second EFA analysis was performed on the remaining 54 items of the employers' satisfaction model using PCA as the extraction method and varimax rotation. Table 4.24 illustrates that seven factors emerged in this study and are clearly tied as hypothesized in the model. Factor loadings for items retained in this analysis range from 0.34 to 0.84. The KMO and Bartlett's test of sphericity were conducted to analyze running factor analysis suitability. The results suggest that the matrix is factorable with KMO test value of .80 and Bartlett's test of sphericity of $\chi 2$ (df= 1485, n = 195) = 6346.35, $p < .000$.

To determine whether or not the items for a construct share a single underlying factor and if they are unidimensional, EFA was performed. Factor 3 indicates item SEIS5 produced a low factor loading of less than 0.40 and a decision was made to omit SEIS5 for improved clarity (Hair *et al.* 2010). Moreover, items TS2 and TS4 in factor 5 (SPS group) and items TS1 and TS3 in factor 7 (AS group) had been entered in the wrong group of factors. Thus, items TS2, TS4, TS1 and TS3 were deleted and EFA was conducted again.

Table 4.24

Exploratory factor analysis of Employers' satisfaction items 2

Items	Factor						
	1	2	3	4	5	6	7
EgS9-Ability to apply knowledge in multidisciplinary engineering.	0.76						
EgS10-Ability to use techniques for engineering practices in work.	0.74						
EgS8-Ability to apply skills, access to and knowledge of science and engineering fundamentals.	0.74						

Table 4.24 (continued)

Items	Factor						
	1	2	3	4	5	6	7
EgS2-Skills/ability of using engineering tools effectively (Other than Computer).	0.73						
EgS7-Ability to analyze engineering design.	0.73						
EgS11-Demonstrate ability to use modern/latest engineering software.	0.71						
EgS4-Ability to identify, formulate and solve technical/engineering problems.	0.70						
EgS3-Ability to design a system, component or process to meet desired needs.	0.69						
EgS1-Ability to apply knowledge of mathematics, science and engineering.	0.69						
EgS6-Demonstrate knowledge and understanding of engineering systems.	0.68						
EgS5-Ability to design and conduct experiments, analyze and interpret data.	0.66						
FGS4-Knowledge of contemporary issues.		0.76					
FGS3-Able to communicate in other languages (English, Mandarin, etc.)		0.75					
FGS5-Understanding information presented in a variety of forms (graphs, charts, diagrams etc.).		0.68					
FGS6-Use different computer applications (Spreadsheets, such as entering data, formulae, copying, linking, etc.).		0.67					
FGS8-Show good personality in terms of dressing and style.		0.66					
FGS1-Demonstrate listening skills.		0.63					
FGS2-Demonstrate high communication skills (English).		0.61					
FGS7-Demonstrate basic computer soft skills for simple tasks (words processing, such as formatting, inserting graphics into documents, etc.).		0.57					
SEIS10-Deal with others with honesty and integrity.			0.78				
SEIS9-Demonstrate work ethics that are aligned with the workplace ethics.			0.76				
SEIS2-Practice ways to resolve conflicts.			0.62				
SEIS7-Demonstrate maturity and emotional stability to manage pressure and burden of work.			0.61				
SEIS8-Stay focused and calm in situations.			0.60				
SEIS3-Display evidence of self-esteem, confidence and self-motivation.			0.59				
SEIS1-Adjust to workplace changes (Flexibility).			0.58				
SEIS6-Show positive attitude toward job.			0.48				
SEIS5-Show stability in terms of emotional, attitude and style.			0.31				

Table 4.24 (continued)

Items	Factor						
	1	2	3	4	5	6	7
ESS4-Engineering graduates who have been hired by this company are well trained by Malaysian public HEIs.				0.84			
ES3-Overall, fresh engineering graduates who your company has hired are very skillful and highly talented in technical work.				0.82			
ES2-Do you think fresh engineering graduates who your company has hired are fully equipped with the necessary technical skills?				0.78			
ES5-Overall, all engineering graduates who have been hired by your company have been fully molded according to industry needs.				0.76			
ES1-Overall, are you satisfied with the technical and engineering fresh graduates who you have hired over the last three years?				0.74			
SPS1-Practice time management in completing assigned tasks.					0.69		
SPS2-Demonstrate accountability to work under pressure.					0.69		
SPS12-Display positive attitude towards work.					0.67		
SPS13-Demonstrate punctuality at work.					0.64		
SPS3-Show an ability to work under pressure.					0.56		
SPS14-Use appropriate occupational safety practices.					0.41		
SPS4-Commitment to life-long-learning					0.38		
SPS8-Graduates' skills are in accordance with this company's needs.						0.67	
SPS10-Demonstrate ability to work independently (Reliability).						0.64	
SPS7-Identify entrepreneurship skill.						0.61	
SPS9-Identify new approaches to solve problems (Creativity).						0.57	
SPS11-Maintain self-control (Maturity).						0.50	
SPS5-Ability to balance work and personal life.						0.44	
TS2-Understand the role in a group.						0.42	
TS4-Respond to constructive criticism in group.						0.34	
AS4-Display individual intelligence and genius.							0.55
AS3-Show uniqueness in terms of skills, attitude and knowledge.							0.53
AS6-Demonstrate individual creativity in work and to solve problems.							0.54
AS7-Demonstrate high knowledge, skills, attitude and other characteristics (KSAOs)							0.54
AS5-A fast learner in learning or doing the job.							0.52

Table 4.24 (continued)

Items	Factor						
	1	2	3	4	5	6	7
TS1-Understand and aligned with business conducted.							0.45
TS3-Demonstrate appropriate skills in interacting with others (Supervisors, customers, colleagues and others).							0.41

The third EFA analysis was performed on the remaining 49 items of the employers' satisfaction model using PCA as the extraction method and varimax rotation. Table 4.25 illustrates that seven factors emerged in this study and are clearly tied as hypothesized in the model. Factor loadings for items retained in this analysis range from 0.42 to 0.83. To analyze the suitability for running factor analysis, KMO and Bartlett's test of sphericity were performed. The results yielded that the matrix is factorable with KMO test value of .80 and Bartlett's test of sphericity at $\chi 2\ (df = 1225, n = 195) = 5725.60, p < .000$.

After rotation, the first factor accounted for 12.79% of the total variance, second, 8.97%, third, 8.86%, fourth, 7.42%, fifth, 7.10%, sixth, 6.03% and seventh, 5.61% (Table 4.25).

The Specific Personal Skills was divided into two new groups, i.e., Interpersonal skills and Behavioral skills. The explanation on this is in section 4.9.3 as re-statement hypotheses and section 4.9.4 as the re-construction of a new research framework.

Table 4.25

Exploratory factor analysis of Employers' Satisfaction *items 3*

Items	Factor						
	1	2	3	4	5	6	7
EgS8-Ability to apply skills, access to and knowledge of science and engineering fundamentals.	0.75						
EgS2-Skills/ability of using engineering tools effectively (Other than Computer).	0.74						
EgS7-Ability to analyze engineering design.	0.74						
EgS9-Ability to apply knowledge in multidisciplinary engineering.	0.73						
EgS10-Ability to use techniques for engineering practices in work.	0.73						
EgS4-Ability to identify, formulate and solve technical/engineering problems.	0.73						
EgS11-Demonstrate ability to use modern/latest engineering software.	0.71						
EgS3-Ability to design a system, component or process to meet desired needs.	0.71						
EgS1-Ability to apply knowledge of mathematics, science and engineering.	0.69						
EgS6-Demonstrate knowledge and understanding of engineering systems.	0.67						
EgS5-Ability to design and conduct experiments, analyze and interpret data.	0.67						
SEIS10-Deal with others with honesty and integrity.		0.76					
SEIS9-Demonstrate work ethics that are aligned with the workplace ethics.		0.76					
SEIS3-Display evidence of self-esteem, confidence and self-motivation.		0.67					
SEIS2-Practice ways to resolve conflicts.		0.66					
SEIS1-Adjust to workplace changes (Flexibility).		0.62					
SEIS7-Demonstrate maturity and emotional stability to manage pressure and burden of work.		0.61					
SEIS8-Stay focused and calm in situations.		0.60					
SEIS4-Show willingness to be relocated, if needed.		0.60					
SEIS6-Show positive attitude toward job.		0.49					
FGS4-Knowledge of contemporary issues.			0.76				

Table 4.25 (continued)

Items	Factor						
	1	2	3	4	5	6	7
FGS3-Able to communicate in other languages (English, Mandarin, etc.)			0.74				
FGS5-Understanding information presented in a variety of forms (graphs, charts, diagrams, etc.).			0.71				
FGS6-Use different computer applications (Spreadsheets, such as entering data, formulae, copying, linking etc.).			0.69				
FGS8-Show good personality in terms of dressing and style.			0.67				
FGS7-Demonstrate basic computer soft skills for simple tasks (words processing, such as formatting, inserting graphics into documents, etc.).			0.61				
FGS1-Demonstrate listening skills.			0.61				
FGS2-Demonstrate high communication skills (English).			0.58				
ES3-Overall, fresh engineering graduates who your company has hired are very skillful and highly talented in technical work.				0.83			
ES4-Engineering graduates who have been hired by this company are well trained by Malaysian public HEIs.				0.83			
ES2-Do you think fresh engineering graduates who your company has hired are fully equipped with the necessary technical skills?				0.79			
ES5-Overall, all engineering graduates who have been hired by your company have been fully molded according to industry needs.				0.77			
ES1-Overall, are you satisfied with the technical and engineering fresh graduates who you have hired over the last three years?				0.75			
SPS2-Demonstrate accountability to work under pressure.					0.76		
SPS1-Practice time management in completing assigned tasks.					0.74		
SPS3-Show an ability to work under pressure.					0.66		
SPS12-Display positive attitude towards work.					0.60		
SPS13-Demonstrate punctuality at work.					0.59		
SPS4-Commitment to life-long-learning					0.47		
SPS14-Use appropriate occupational safety practices.					0.42		
SPS8-Graduate skills are in accordance with this company's needs.						0.70	
SPS10-Demonstrate ability to work independently (Reliability).						0.68	
SPS9-Identify new approaches to solve problems (Creativity).						0.61	
SPS7-Identify entrepreneurship skills.						0.59	

Table 4.25 (continued)

Items	Factor						
	1	2	3	4	5	6	7
SPS 11-Maintain self-control (Maturity).						0.53	
AS4-Display individual intelligence and genius.							0.74
AS3-Show uniqueness in terms of skills, attitude and knowledge.							0.71
AS7-Demonstrate high knowledge, skills, attitude and other characteristics (KSAOs)							0.64
AS5-A fast learner in learning or doing the job.							0.64
AS6-Demonstrate individual creativity in work and to solve problems.							0.62

4.9.2 EFA for Moderator (Employers' Impression)

195 samples underwent EFA using PCA as the extraction method and varimax rotation to assess the five items of Employers' Impression underlying structure to determine whether or not the items for a construct share a single underlying factor or unidimensional (Table 4.26). To determine the running factor analysis suitability, the KMO and Bartlett's test of sphericity were conducted. All the results suggest that the matrix is factorable with KMO test value of .70 and Bartlett's test of sphericity at $\chi 2$ ($df = 10$, $n = 195$) = 247.33, $p < .000$. Principal component factoring identified the presence of one factor with eigenvalue above 1, and the extracted factor accounted for 48.76 percent of the total variance. Data from the component matrix indicated that all factor loadings were generally high at above .60. The items loaded heavily on the same factor, providing evidence of high convergent validity. Thus, this factor can be considered a dimension of Employers' Impression.

Table 4.26

Exploratory factor analysis of Employers' Impression items

Items	Loading
EI1- The entry-level engineer tries to show you that he/she is a friendly person with good attitude and behavior.	0.65
EI2-The entry-level engineer tries to let you think that he/she is responsible for the positive events that occur in the work group.	0.63
EI3- The entry-level engineer tries to show you that he/she tries to do a good job with high quality in your company.	0.79
EI4- The entry-level engineer tries to impress you that he/she is a "good" worker.	0.77
EI5- The entry-level engineer shows the value of a positive event that you have taken the credit for.	0.63

4.9.3 Restatement of Hypotheses

Due to some variations in self-rating on specific personal skills and derived from the factor analysis presented earlier, seven hypotheses on Employers' Satisfaction dimension were restated. Specific Personal Skills was divided into two new factors, i.e., Interpersonal skills and Behavioral skills. Teamwork Skills was removed due to multicollinearity and low factor loading.

The justification for the new constructs of interpersonal skills and behavioural skills after EFA was performed. Tsui and Ashford (1994) stated, an individual need and must have specific interpersonal and behavioral skills to ascertain and respond to their organizations' views while conveying the influence and impression that they're self-confident and certain of their own agendas to achieve reputation effectiveness.

Specifically, interpersonal skills can help to achieve personal goals, as well as influence others and the larger organization. These skills give the foundation to be employed, retained and successful in the engineering field (Zaharim, 2010). Therefore, individuals must possess certain personal and interpersonal competencies, in order to determine and respond to their constituents' views while conveying the impression that they are confident and certain of their own agenda to achieve reputation effectiveness (Beenen & Pichler 2018).

Research also has indicated that interpersonal skills are relevant in the workplace (Weber *et al.* 2013). Andrews and Higson (2008) identified that interpersonal skills can enhance employability of graduates. Based on this discussion, this research implies that interpersonal skills are related positively to the engineering graduates employability. This resulted in the replacement of H4 with a new H4a:

H4a: There is a positively significant relationship between interpersonal skills and employers' satisfaction

Ang (2015) asserted that employers suggest the skills to solve the problems needed will change depending on the level of complexity of the task and type of problem faced by the workers. Every worker should be exposed to this skills-set type, especially in the manufacturing industry, where employers must interact with new staff daily in a

complex setting. New engineers and engineers inspired to succeed in their profession and be promoted should possess these behavioural skills (DEST, 2006).

Graduate-related skills comprise work independently, solve problems within entrepreneurial skills to and maintain self-control toward employment. These behavioural skills develop an employee as a whole. In other words, employability skills consist of behavioural skills that are relevant for prospective engineers to effectively manage and sustain their carreers (Gamboa & Peiro, 2018). Based on this discussion, this research implies that positively the behavioral skills are related to the engineering graduates employability. This resulted in the replacement of H4 with a new H4b: The details of the initial and restatement hypotheses are presented in Table 4.25.

H4b: There is a positively significant relationship between behavioural skills and eemployers' satisfaction.

Table 4.27

Re-Statement of Hypotheses

Initial hypotheses		Restatement hypotheses	
H1	There is a positively significant relationship between fundamental general skills and employers' satisfaction	H1	**No change**

Table 4.27 (continued)

Initial hypotheses		Restatement hypotheses	
H2	There is a positively significant relationship between engineering skills and employers' satisfaction	H2	**No change**
H3	There is a positively significant relationship between teamwork skills and employers' satisfaction	H3	**-Removed-**
H4	There is a positively significant relationship between specific personal skills and employers' satisfaction	H4a	There is a positively significant relationship between interpersonal skills and employers' satisfaction
		H4b	There is a positively significant relationship between behavioural skills and employers' satisfaction
H5	There is a positively significant relationship between adaptive skills and employers' satisfaction	H5	**No change**
H6	There is a positively significant relationship between self-emotional intelligence skills and employers' satisfaction	H6	**No change**
H7	The effect of fundamental general skills on employers' satisfaction is highly moderated by employers' impression	H7	**No change**
H8	The effect of engineering skills on employers' satisfaction is highly moderated by employers' impression	H8	**No change**
H9	The effect of teamwork skills on employers' satisfaction is highly moderated by employers' impression	H9	**-Removed-**

Table 4.27 (continued)

Initial hypotheses		Restatement hypotheses	
H10	The effect of specific personal skills on employers' satisfaction is highly moderated by employers' impression.	H10a	The effect of interpersonal skill on Employer satisfaction is highly moderated by employer impression
		H10b	The effect of behavioural skill on Employer satisfaction is highly moderated by employer impression
H11	The effect of adaptive skills on employers' satisfaction is highly moderated by employers' impression.	H11	**No change**
H12	The effect of self-emotional intelligence skills on employers' satisfaction is highly moderated by employers' impression.	H12	**No change**

4.9.4 Reconstruction of New Research Framework

After conducting EFA, the results indicate that the research framework proposed in Chapter 2 needs to be modified. Although the statistical results indicate a new research framework must be constructed due to the adjustments in the constructs for specific personal skills and teamwork skills, which were removed, this study only carried this out based on theoretical support. Based on the statistical considerations, one construct was deleted, that is teamwork skills as independent variable. Additionally, the specific personal skills construct was split into two new constructs, namely interpersonal skills and behavioural skills. Due to that, the new research framework is illustrated in Figure 4.3.

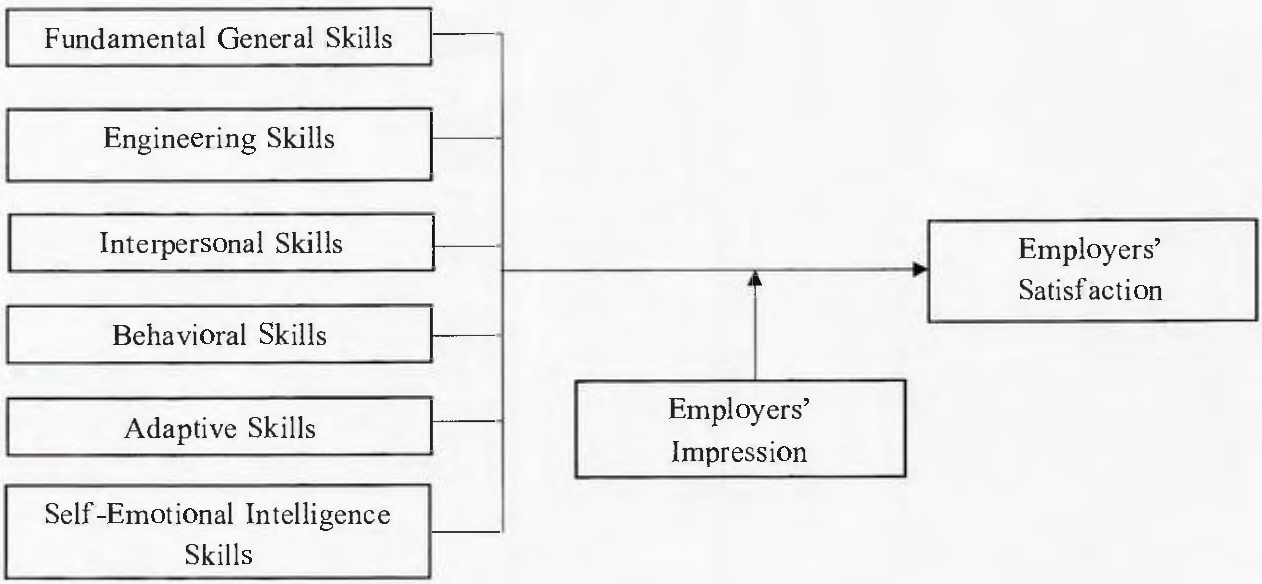

Figure 4.3: *New Research Framework*

4.10 Reliability Analysis

In addition, several Cronbach's alpha tests were conducted to measure the level of internal consistency and reliability of the constructs. The Cronbach's alpha values reveal that the following subscales demonstrate sufficient levels (alpha 0.70 or greater) for internal reliability. An item analysis was conducted to determine the items that formed an internal consistent scale in this study, and the items that were not consistent were eliminated.

The factor analysis procedure in SPSS was used to compute Cronbach's Alpha. It uses an item-to-total correlation assessment to test the internal consistency of the

instruments. The items are considered unidimensional and could be combined in a scale if alpha is greater or equal to .60, then. For social science research, .70 and .80 is considered satisfactory whereas Cronbach's standardized alpha coefficients between .50 to .60 are sufficient within an acceptable range (Hair et al., 1998). To determine which items would be retained in the further analysis using factor analysis, item-to-total correlations of .30 or greater were used. Table 4.28 shows the variables Cronbach's alpha value, which was more than .80. Hence, this variable is accepted and preferable for investigation.

Table 4.28

Reliability of construct for Employers' satisfaction *(N = 195)*

Number of items	Constructs	Cronbach's Alpha
8	Fundamental general skills	.87
11	Engineering skills	.92
7	Interpersonal skills	.79
5	Behavioral skills	.78
7	Adaptive skills	.84
10	Self-emotional intelligence skills	.86
5	Employers' satisfaction	.90
5	Employers' Impression	.74

4.11 Correlation analysis between variables

Table 4.29 illustrates the correlation between the skills factors, employers' satisfaction and employers' impression of manufacturing employers. The dimensions of skills factors are fundamental general skills, engineering skills, interpersonal skills, behavioural skills, adaptive skills and self-emotional intelligence skills as independent

variables and employers' satisfaction as the dependent variable. It can be seen that there are positive correlations between all dimensions of the skills factors, employers' satisfaction and employers' impression. The positive linear relationship means an increase in one variable will cause the other variable to also increase. Most of the correlation results indicate a low correlationship between each dimension.

Furthermore, Table 4.29 shows zero-order correlations among the constructs and provides a general picture of their interrelationships. The confidence interval around the correlation estimate between any two constructs should not be 1.0, indicating that discriminant validity does not exist in the factor-based scales.

Table 4.29

Correlation between skills ability and Employers' Satisfaction

	a)	b)	c)	d)	e)	f)	g)	h)
a) Fundamental General Skills	1							
b) Engineering Skills	0.269***	1						
c) Interpersonal Skills	0.335***	0.178*	1					
d) Behavioural Skills	0.480***	0.423***	0.519***	1				
e) Adaptive Skills	0.124	0.202**	0.101	0.251***	1			
f) Self-Emotional Intelligence Skills	0.189**	0.266***	0.242**	0.401***	0.201**	1		

Table 4.29 (continued)

	a)	b)	c)	d)	e)	f)	g)	h)
g)Employers' Satisfaction	0.370***	0.345***	0.229**	0.173*	0.169*	0.227**	1	
h) Employers' Impression	0.414***	0.674***	0.264***	0.427***	0.266***	0.295***	0.712***	1

*** Correlation is significant at the 0.000 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

4.12 Multiple regressions analysis

Regressions analysis is used to analyse relationships between a dependent variable and one or more independent variables (Kumar *et al.* 2013; Malhotra, 2007). This study used multiple regressions analysis to predict the values of the dependent variable, given a set of explanatory variables (Kumar *et al.* 2013). These analyses were to determine the strongest determinants of skills, which are detailed in section 4.12.1.1 to explore eemployers' satisfaction, linear regression was conducted (section 4.12.1.2). Each variable was tested to determine the extent that the skills enhance employers' satisfaction in the organization.

4.12.1 Hypotheses Testing

Multiple regressions analysis was conducted to explore the relationship between the dependent variable and each category of independent variables. Table 4.30 shows the multiple regressions analysis in determining the relationship between the independent variables (fundamental general skills, engineering skills, interpersonal skills,

behavioural skills, adaptive skills, self-emotional intelligence skills), which was used to predict skills of graduates for employability and employers' satisfaction. Hypotheses 1-7 tested the influence of seven skills factors.

4.12.1.1 Relationship between Fundamental General Skills, Interpersonal Skills, Behavioral Skills, Engineering Skills, Adaptive Skills, Self-emotional Intelligence Skills and Employers' Satisfaction.

The multiple regressions analysis results in Table 4.30 showed skills factors have a significant relationship with skills of engineering graduates' employability with R = 0.509. The adjusted R2 of the model is 0.235, which indicates 23.5 percent of the variation in engineering graduates' employability among manufacturing employers is explained by the graduates' skills.

Table 4.30

Multiple Regression Analysis for Determining the Relationships between the Skills Factors and Employers' Satisfaction

Variables (Skills Factors)	Regression Model (Employers' satisfaction)		
	Unstandardized Coefficients	Standardized Coefficients	Sig
	B	B	
Constant	1.380		
(H1) Fundamental general skills	0.318	0.330	0.000
(H2) Engineering skills	0.278	0.286	0.000
(H4a) Interpersonal skills	0.176	0.166	0.027

Table 4.30 (continued)

Variables (Skills Factors)	Regression Model (Employers' satisfaction)		
	Unstandardized Coefficients	Standardized Coefficients	Sig
	B	B	
(H4b) Behavioural skills	0.417	0.271	0.002
(H5) Adaptive skills	0.091	0.093	0.157
(H6) Self-emotional intelligence skills	0.175	0.138	0.048
R		0.509	
Adjusted R2		0.235	

Fundamental general skills (B=0.330, p=0.000) has a significant relationship with employers' satisfaction. Thus, H1 is supported. Engineering skills (B=0.286, p=0.000) has a significant relationship with employers' satisfaction. Thus, H2 is also supported. Two skills factors have positive relationships with employers' satisfaction, i.e., fundamental general skills and engineering skills. These two skills are essential in organizations for successful engineering practices and to achieve career expectations. These skills are expected by Malaysian manufacturing organizations of engineering graduates.

Interpersonal skills (B=-0.166, p=0.027), behavioural skills (B=0.271, p=0.002) and self-emotional intelligence skills (B=0.138, p=0.048) have a significant relationship with employers' satisfaction. Therefore, H4a, H4b and H6 are supported; while adaptive skills (B=0.093, p=0.157) has an insignificant relationship with eemployers' satisfaction. Thus, H5 is not supported.

Interpersonal skills, behavioural skills and self-emotional intelligence skills have significant relationships with employers'' satisfaction. The results show that those skills of graduates are not only needed to acquire good academic results, but also to give a positive attitude towards the job. The skills are very important for ensuring the productivity and output of the company. Without the proper skills, employers will face problems in dealing with work and the workers in the company.

The regression equation shown below is based on the results from Table 4.30:

Employer satisfaction= 0.318 (fundamental general skills)+ 0.278 (engineering skills) + 0.176 (interpersonal skills) + 0.417 (behavioural skills) + 0.091 (adaptive skills) + 0.175 (self-emotional intelligence skills)+ 1.380.

4.12.1.2 Relationship between Skills Factors and Employers' Satisfaction

Table 4.31 shows Analysis of Variance (ANOVA) for ascertaining the relationship between the skills factors and employers' satisfaction (F=10.954, p=0.000), indicating that the regression model results could occur by chance. Nevertheless the significance of ANOVA and p-value of coefficients must indicate $p<0.05$. Thus, the model is significant with 0.000 significance value.

Table 4.31

ANOVA[b] for Determining the Relationships between the Skills Factors and Employers' satisfaction

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1.	Regression	16.257	6	2.709	10.954	.000[a]
	Residual	46.502	188	0.247		
	Total	62.759	194			

a. Predictors: (Constant) Self-Emotional Intelligence Skills, Fundamental General Skills, Adaptive Skills, Engineering Skills, Interpersonal Skills, Behavioural Skills
b. Dependent Variable: Employers' Satisfaction

4.12.2 Skills for Employers' Satisfaction

The hypotheses that are supported or not supported as a result of multiple regressions analysis and employers' satisfaction are summarized in Table 4.32. The skills factors are fundamental general skills, engineering skills, interpersonal skills, behavioural skills, adaptive skills and self-emotional intelligence skills. Those observed variables were hypothesized as having positive and negative relationships with employers' satisfaction.

Table 4.32

Summary of Testing of the Hypothesis

Hypothesis	Proposed Hypothesis	Results
H1	There is a positively significant relationship between fundamental general skills and employers' satisfaction	**SUPPORTED**

Table 4.32 (continued)

Hypothesis	Proposed Hypothesis	Results
H2	There is a positively significant relationship between engineering skills and employers' satisfaction	**SUPPORTED**
H4a	There is a positively significant relationship between interpersonal skills and employers' satisfaction	**SUPPORTED**
H4b	There is a positively significant relationship between behavioural skills and employers' satisfaction	**SUPPORTED**
H5	There is a positively significant relationship between adaptive skills and employers' satisfaction	**NOT SUPPORTED**
H6	There is a positively significant relationship between self-emotional intelligence skills and employers' satisfaction	**SUPPORTED**

Based on the results, fundamental general skills (H1), engineering skills (H2), interpersonal skills (H4a), behavioural skills (H4b), and self-emotional intelligence skills (H6) have a positive relationship with employers' satisfaction. Adaptive skills (H5) is not supported.

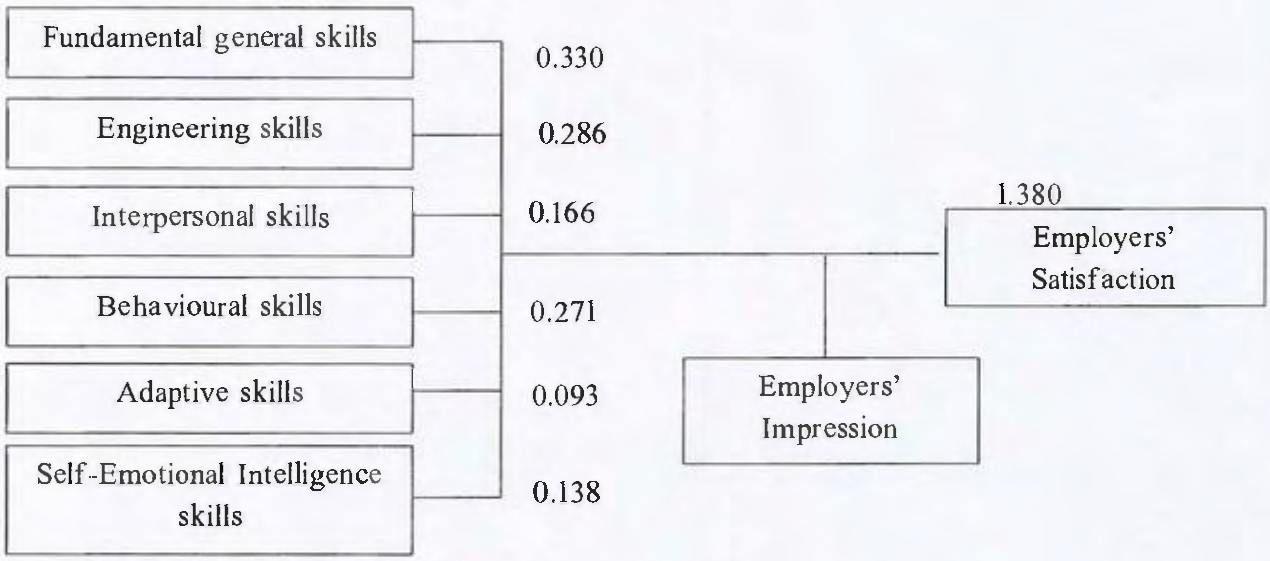

Figure 4.4: *Statistical Diagram of Multiple Regressions Analysis Result*

4.13 Multiple regressions analysis (Moderating effect)

Finally, this study used multiple regressions analysis suggested by Hayes (2013) to measure the moderating effect of employers' impression on the relationship between the skills factors and employers' satisfaction,

The following hypotheses examined the effects of the moderator:

H7: The effect of fundamental general skills on employers' satisfaction is highly moderated by employers' impression.

H8: The effect of engineering skills on employers' satisfaction is highly moderated by employers' impression.

H10a: The effect of interpersonal skills on employers' satisfaction is highly moderated by employers' impression.

H10b: The effect of behavioural skills on employers' satisfaction is highly moderated by employers' impression.

H11: The effect of adaptive skills on employers' satisfaction is highly moderated by employers' impression.

H12: The effect of self-emotional intelligence skills on employers' satisfaction is highly moderated by employers' impression.

A three-block multiple regression was conducted to test the effects of the moderator. Mean-centred variables of fundamental general skills, engineering skills, interpersonal skills, behavioural skills, adaptive skills and self-emotional intelligence skills filled the first block. The second block contained the mean-centred moderator of employers' impression. The third and last block of the regression comprised six interaction terms and this block was conducted step-wise so that each interaction term was only entered into the equation if it was statistically significant.

This multiple regression was conducted to decrease the multicollinearity effects. The F tests showed that the main effect (Model 1) and the independent main effect (Model 2) were both significant (Table 4.33). No interaction effect was significant, thus, they were not entered into the equation during the regression.

66.1% were accounted of the total variance in Employers' satisfaction when the predictor variables were entered into the regression equation in the first step. accounted for. When the interaction variables were entered into the equation in the final step, there was a significant increase in explained variance in employers' satisfaction (R square change= 0.400; p=.000).

Table 4.33 illustrates the multiple regressions analysis results. The effect of fundamental general skills on employers' satisfaction is highly moderated by employers' impression and is constant (B=.182, p=.004), where p-value of direct and interaction in Model 2 is significant; thus H7 is supported. Next, the effect of engineering skills on employers' satisfaction is highly moderated by employers' impression and is reduced (B=.105, p=.080), when p-value of direct and interaction in Model 2 is not significant; thus H8 is not supported.

Table 4.33

Results of Multiples Regressions Analysis

Variables	Direct effect on Employers' Satisfaction		Direct and interaction effect on Employers' Satisfaction	
	B	**Sig.**	**B**	**Sig.**
(Model 1) Independent variables				
Fundamental general skills	.330	.000	.288	.000
Engineering skills	.286	.000	.177	.016
Interpersonal skills	.166	.027	.258	.000
Behavioural skills	.271	.002	.261	.001
Adaptive skills	.093	.157	.061	.321
Self-emotional intelligence skills	.138	.048	.239	.000
(Model 2) Interaction variables				
(H7) EI*fundamental general skills			.182	.004
(H8) EI*engineering Skills			.105	.080
(H10a) EI*interpersonal skills			.097	.268
(H10b) EI*behavioural skills			.206	.003
(H11) EI*adaptive Skills			.131	.033
(H12) EI*self-emotional intelligence skills			.270	.001
R^2	.259		.437	
Adjusted R^2	.235		.400	
F-chang (Sig.)	10.954***		9.574***	
N	195			

***significant at the 0.001level

Next, the effect of interpersonal skills on employers' satisfaction is highly moderated by employers' impression and is increased (B=.097, p=.268), when p-value of direct and interaction in Model 2 is not significant; thus, H10a is not supported.

Finally, the results of H10b, H11 and H12 are all significant, where the behavioural skills (B=.206, p=.003), adaptive skills (B=.131, p=.033) and self-emotional intelligence skills (B=.270, p=.001) are all reduced. Thus, H10b, H11 and H12 are supported.

The above results of the moderating effect of employers' impression on the relationship between the skills factors and employers' satisfaction are summarized in Table 4.34.

Table 4.34

Summary of Testing the Hypothesis on Moderating Variable

Hypothesis	Proposed Hypothesis	Results
H7	The effect of fundamental general skills on employers' satisfaction is highly moderated by employers' impression.	**SUPPORTED**
H8	The effect of engineering skills on employers' satisfaction is highly moderated by employers' impression.	**NOT SUPPORTED**
H10a	The effect of interpersonal skills on employers' satisfaction is highly moderated by employers' impression.	**NOT SUPPORTED**

Table 4.34 (continued)

Hypothesis	Proposed Hypothesis	Results
H10b	The effect of behavioural skills on employers' satisfaction is highly moderated by employers' impression.	**SUPPORTED**
H11	The effect of adaptive skills on employers' satisfaction is highly moderated by employers' impression.	**SUPPORTED**
H12	The effect of self-emotional intelligence skills on employers' satisfaction is highly moderated by employers' impression.	**SUPPORTED**

4.14 Summary

As a conclusion, the analyses demonstrate the skills factors (fundamental general skills, engineering skills, interpersonal skills, behavioural skills, adaptive skills and self-emotional intelligence skills) and the effect on employers' impression and employers' satisfaction. The analyses process started with the response rate, content validity, construct validity and reliability, demographic frequency analysis and descriptive analysis.

This study also tested for response bias for early and late responses from the respondents. The next process was to run EFA in order to reduce items of constructs. In this process, teamwork skills was removed due multicollinearity and low factor loading. The specific personal skills factor was divided into two new factors, renamed

as interpersonal skills and behavioural skills. The multiple regressions analysis was performed to answer the objectives of this study. The results show that H1, H2, H4a, H4b and H6 are supported. However, H5 is not supported.

The moderating effect of employers' impression was tested through multiple regressions analysis. The results indicate that H7, H10b, H11 and H12 highly moderate the relationships, and the hypotheses are thus supported, while H8 and H10a are not moderated and not supported. The next chapter discusses the key findings and conclusion to answer the research objectives in this study, the implication and contribution.

CHAPTER FIVE

DISCUSSION, IMPLICATION, LIMITATION, RECOMMENDATION AND CONCLUSION

5.1 Introduction

This chapter is the last part of this study. It discusses in detail the findings of various hypotheses formulated in chapter 2 and the findings derived from chapter 4. Then implication of the findings, the limitations, the recommendations for future research and suggestions to the Ministry of Education (MOE), Higher Education Institution (HEIs), engineers and manufacturing employers. Finally, the chapter presents the theoretical, implication and practical benefits of the present research and a conclusion of the study.

5.2 Discussion of research findings

The results of this study are presented to answer the research question listed in chapter 1. This study examines the main effects of skills, i.e., fundamental general skills, engineering skills, interpersonal skills, behavioral skills, adaptive skills and self-emotional intelligence skills on employers' satisfaction. Next, the moderating effect of employers' impression on the relationship between fundamental general skills, engineering skills, interpersonal skills, behavioral skills, adaptive skills and self-emotional intelligence skills and employers' satisfaction. The following sections discuss the answer to each research question.

5.3 Answering Research Questions Objective

- *What is the employers' satisfaction level with entry-level engineers' skills?*

- *What is the relationship between engineers' skills ability and employers' satisfaction?*

Regarding the first and second research questions, with regards to the evaluation of manufacturing employers' satisfaction with graduates' skills, the results indicate that all skills are important. This been confirmed by Asuquo and Inaja (2013), stated that the demanding environment and due to fast changing of today's, employers regard all skills as important when they are need to train and retain efficient workers to achieve competitive advantage.

Descriptive statistics reveal that although skills ability is assessed for all the appeared skills factors, somehow, they are evaluated higher in interpersonal skills, behavioural skills, adaptive skills, leadership, communication ability, time management and problem solving. Baker *et al.* (2014), concluded that Malaysian manufacturing employers evaluate all jobs skills collected through employer satisfaction, with the capability and willing to learn, teamwork and cooperation, energy and passion, and communication being rated better and higher compare than others. Interestingly, Baker *et al.* (2014) stated, extend to which employers believe that engineering graduates have these specific skills does no longer match the level of interest in employability.

Most significantly, there are standard agreements between employers and graduates regarding the specific type of skills used in the survey, there is much less agreement regarding ownership of these skills. In general, this research confirms that manufacturing employers verify as essential an extensive range of ability skills and capability when looking for, and particularly, when maintaining their workers.

A multiple regression analysis was conducted to ascertain factors that might affect a graduate's skills ability and the employers' satisfaction needed for success. The data reveals that only fundamental general skills and engineering skills affect employability. Those graduates who indicate they are to enter the workforce directly upon graduation are more positive in their skills of basic communication, listening, using the computer and other technologies. This might be expected given that fresh graduates (engineering) entering the labor market are assume to master the technical literacy to succeed in the workplace. None of the factors, including engineering skills, interpersonal skills, behavioral skills, self-emotional intelligence skills and adaptive skills, affects a graduate achievement of the skill areas required for employment success. Thus, the basic skills for graduates, such as communication, listening and personal skills, is priority for employability.

In addition, DEST (2006) affirms the importance of graduate skills as an equipment to help them in evaluate to show the technical competence and skills to maintain and achieve successful work outcomes. Graduate skills are essential in a competitive business surrounding (Zaharim & Omar, 2010). The skills are also transferable (Yorke,

2006) and applicable from one place to another (Zaharim & Omar, 2010). These skills have a strong influence in increasing employability opportunities.

Managers in the manufacturing industry need the new engineers to execute engineering-related skills and apply knowledge effectively. The engineering labor market has become more knowledge-based and global which triggers the importance of developing the ability of graduate skills globally (DEST, 2006; Lee, 2003; Zaharim & Omar, 2010) which will guide skilled engineers who are equip for industry practices internationally and locally, and as a benchmark for engineering graduates to be skilled and competent engineers. Engineering skills are highly related to technical and non-technical skills or abilities.

Moreover, the findings in this study concur with Zaharim *et al.* (2004), in that managers require generic skills that can be applied to all industries to improve graduates' skill and abilities, to improve employment and successful in their selected careers.

- *What is the moderating effect of employers' impression on the relationship between engineers' skills and employers 'satisfaction ?*

The third research question is to the moderating effect of employers' impression on the relationship between engineers' skills and employers' satisfaction. In answering this research question, the constructs developed in Chapter 3 were tested using multiple

regressions analysis in Chapter 4. The results indicate that employers' evaluation is quite useful in the manufacturing firms in order to tackle graduates' employability skills in the workforce. The high evaluation and impression of employers in organizations show that engineering skills and self-emotional intelligence skills are more important for employability compared to other skills. Thus, the evaluation from manufacturing managers is not needed for interpersonal, behavioral and adaptive skills, in order to be employed as an engineering graduate.

Furthermore, the research question for moderator impression management have been focus to answer the essential purpose need for engineering graduates to act for. For the first three question from moderating effects is focus more to the superior focus. It's mean what actually the supervisor want and look to the engineering graduate and what the engineering graduates can deliver for their own self. The engineering graduate need to show to their superior regarding their ability such as a friendly person with others colleague. Its mean, that the engineering graduate will show that he/she have a good attitude and good behavior to the superior. With this regard, the engineering graduate have shown that they have the characteristic need by the company and will influence to the career path and promotion in future.

In addition, engineering graduate will also try to show to the superior that them is the one who positively responsible for the events that happen in the group work. Engineering graduates will try to satisfy the superior with the responsibility their show to the superior. With this regard, superior will know that they a trying the best to handle

the events with credibility and full of responsibility to make its success. At the same time, the engineering graduate show that they can handle the event even though maybe it's seem have difficulty to be done. Its mean the engineering graduate can resolve the problem occur regarding to conduct any event.

Furthermore, the engineering graduate try to show to their superior that their tries to do their best with the assign job to them and will deliver the job with a high quality output in that company. With this regard, the engineering graduates have try to deliver their best expertise in the job given and at the same time will make the superior proud and confidence that their can do the task given to them with high output and the best outcome ever. With the high quality job output, the engineering graduates will get the trust from the superior and believe that they can done any others job assign to them. Its mean, the superior have put the trust to the engineering graduate that they can make the job and task given to them and deliver a very high standard quality of outcome from the job given.

In additional, the last two question is regarding to the job focus. For the first question, the graduate engineering will try to impress the superior with show that he/she is a good worker. Its mean, they will try to show that he/she is a good person. With this regard, the engineering graduates will show that he/she is the best workers and the correct person to the job given. At the same time, will show that he/she was a kind person with high determination of works, high discipline in job and always try the best in the organization.

The final question will show that the engineering graduates is a mature person and always have a positive thinking. Even though they doesn't get the credit for, they still can effort to show high value of working spirit and keep effort to work and try the best in the job given. Its mean, this engineering graduate a very mature and have a very high level of patient, thinking and always look what ever happen in a positive ways and always prioritize their superior and job in the organization compare to the credit they should get.

5.4. Main Effects

5.4.1 Relationship between Fundamental General Skills and Employers' Satisfaction

H1: There is a positively significant relationship between fundamental general skills and employers' satisfaction.

A positive relationship between fundamental general skills and employers' satisfaction was suggested in HI. Based on the analysis in Table 4.30, it is found that from the perspective of senior managers of the industry, fundamental general skills are essential and important for the engineering graduates. The results show a significant relationship between Fundamental General Skills and Employers' Satisfaction (B=0.33, p=0.000); this means engineering graduates must be equipped with the basic engineering skills.

One of the basic skills for engineering graduates to be hired by industry is high communication skills (English). At the same time, this result shows that employers are satisfied with the fundamental general skills of engineering graduates. In addition, the result shows that fundamental general skills are essential in organizations for successful engineering practices and for engineers to achieve career expectations.

The results, in essence, are same with a past research by Sattar *et al.* (2013), that study reveals graduates must have skills in communicating with people from various ethnicity. Employers need workers that can read, write and explain the complexity concepts in an easily understood manner

The ability to prioritize complex concepts or problems is related and link to the ability to analyze, communicate, and to know and identify problems. Graduates must know how, where and when to use the knowledge to get more effective results. The graduates' ability to combined and exhibit generic skills has been linked to their confidence improvement in the different and new contexts application, including in their workplace (Ramli *et al.* 2010).

However, the analytical skills, knowledge, key attributes and capability to recognize and choose relevant data and information are essential to ease interaction and communication despite being hard to observe. Employers probablyassume graduates to apply underlying ability and skill even though they tend to refer to the skills they can measure without difficulty, (Tsitskari, 2017). Sumanasiri *et al.* (2015) found that

only students (graduate) who can communicate effectively have good chances of employability, which is one of the expected outcomes of higher education.

In addition, skills like open-mindedness and nonverbal expression are important as both relate to capabilities of intercultural communication. Hence, this finding suggests that general skills of engineering graduates further underscore the importance of having an employability skill that is well tailored to the future employers' needs and the nature of that future work.

5.4.2. Relationship between Engineering Skills and Employers' Satisfaction

H2: There is a positively significant relationship between engineering skills and employers' satisfaction

A positive relationship between engineering skills and employers' satisfaction was hypothesized in H2. Based on the analysis in Table 4.30, it is found that engineering graduates must be polish and equipped with engineering skills to ready themselves for entry-level work. The results show a significant relationship between Engineering Skills and Employers' Satisfaction (B=0.286, p=0.000), meaning that engineering graduates must have engineering skills for entry-level recruitment by industry. The result also showed that engineering graduates must possess basic engineering skills in order to be hired by employers, especially the ability to apply skills and have access to and knowledge of science and engineering fundamentals. At the same time, result from

the employer side, they are satisfied with the skills of engineering graduates. In addition, that result indicates that engineering skills are essential in organizations in order to carry out engineering practices successfully and to achieve career expectations. In other words, the findings on engineering skills in this study are significant for employers' satisfaction.

Additionally, Hall (2013) said that in terms of engineering skills in high-tech areas, firms face the problem of recruiting graduates with good engineering skills. It is also reported that more than one in four firms face difficulty in recruiting engineers with good techniques and employability skills. This emphasis and confirm why it is very critical and important of employer Satisfaction toward engineering graduates.

According to literature, engineering skills type must focus on problem solving, design, ability to learn from inquiry and question and also scientific reasoning. Activities that enhance their connections with skill and physical need must be included in today challenging environment. Moreover, Mooney and Laubach (2002) said lecturers in HEIs must include the scenarios of real-life to enhance graduates' skills in related engineering fields to enable graduates to be employed in industry.

5.4.3 Relationship between Interpersonal Skills and Employers' Satisfaction

H3: There is a positively significant relationship between interpersonal skills and eemployers' satisfaction.

A positive relationship between interpersonal skills and employers' satisfaction was suggested in H3. Based on the analysis in Table 4.32, Interpersonal Skills were important skills for graduates of engineering. The results show a significant relationship with employers' satisfaction (B=0.166, p=0.027). This means engineering graduates must be equipped with interpersonal skills to be hired by industry. At the same time, the result showed that employers are satisfied with engineering graduates' interpersonal skills. In this study, this skill was initially specific personal skills that was renamed as interpersonal skills. From the result, it is found that engineering graduates must have good interpersonal skills at work.

Interpersonal skills appear as a means of providing sufficient information regarding one's skills. This result is inconsistent with Robles (2012) and Sisodia and Agarwal (2017), who indicated that the importance of interpersonal skills is not sufficient to satisfy employers. In particular, Beenen and Pichler (2018) mentioned that a person should have adequate personal and interpersonal competencies in order to ascertain and respond to their organizations' views while deliver the satisfaction and impression that they are confident to their own self and confident in their own agendas to acquire good reputation.

Sattar *et al.* (2013) indicated that planning and organizing skills are essential; workers must be able to work independently and manage time well and manage priorities in order to survive. However, these study results differ from other published studies, such

as Robles (2012) and Sheikh, (2009). Employing graduates who possess interpersonal and personal skills is a key factor to get or retain an advantage competitive for an organization.

5.4.4 Relationship between Behavioral Skills and Employers' Satisfaction

H4b: There is a positively significant relationship between behavioural skills and employers' satisfaction.

The positive relationship between behavioural skills and employers' satisfaction was presented as H4b. Based on the analysis in Table 4.32, it is found that behavioural skills is important for engineering graduates. It shows a significant relationship between behavioural skills and employers' satisfaction (B=0.271, p=0.002). This means engineering graduates must have good behaviour and attitude to be hired. Besides, the result shows that employers are satisfied with the behavioural skills of engineering graduates. In addition, it is found that the findings support this hypothesis or other studies that have signified that behavioural skills will lead to employers' satisfaction, (Sisodia & Agarwal, 2017) and essential for engineers to achieve high level in their career and be promoted (DEST, 2006).

Furthermore, a lack of these skills also indicates that graduates will be unable to solve problems that need analysis and acknowledge the problem so that they feel confident in dealing with it.

Thus, these skills are an asset in almost all fields within the changing era, where manufacturing organizations encounter mounting pressure to create a conducive working environment (Sisodia & Agarwal, 2017). Graduate-related skills refer to the ability to work independently and have entrepreneurship skills to solve problems and maintain self-control. These behavioural skills develop an employee as a whole. Due to that, it can be concluded that engineering graduates with effective behavioural skills could help the organization to operate smoothly.

5.4.5 Relationship between Adaptive Skills and Employers' Satisfaction

H5: There is a positively significant relationship between adaptive skills and employers' satisfaction.

A positive relationship between adaptive skills and employers' satisfaction was hypothesized in H5. Based on the analysis in Table 4.32, it is found that adaptive skills do not support engineering graduates for entry-level work. The result shows no significant relationship between adaptive skills and employers' satisfaction (B=0.093, p=0.157), with means adaptive skills are not important in determining the engineering graduates' employability. In other words, graduate skills, such as adaptive skills, will not support the engineering graduates in their pursuit of jobs in the industry.

Other studies also have similar results (e.g., Koen, Klehe, & Van Vianen, 2013; Gonza´lez-Roma´, Gamboa, & Peiro, 2018; Ramli *et al.* 2010). Perhaps, graduates who view themselves as highly efficacious have higher expectations about their jobs, and so, they measure their current jobs quality because these jobs are below their expectations.

Additionally, graduates with strong adaptive skills are able to view and analyse situations logically and systematically (Sisodia & Agarwal, 2017). Based on literature, effective services require these important skills. Nevertheless, some of these skills are not considered most of the time when employing workers at various levels with varying tasks. Individual intelligences, unique skills, high knowledge and attitude, being fast learners and creative in problem solving are few of the attributes of adaptive skills.

Engineering graduates must commit in practicing relevant values to achieve organizational goals and continuous improvement. The continuous professional development concept, which is introduced in engineering studies in universities, has contributed to the value development among graduates through the learning process in the university (Ramli *et al.* 2010). This finding is congruent with a study by Gonza´lez-Roma´, Gamboa, and Peiro (2018), which indicates that graduates need to confront external demands and changes and be able to adapt, identify and realize employability skills opportunities in the changing environment.

5.4.6 Relationship between Self-Emotional Intelligence Skills and Employers' Satisfaction.

H6: There is a positively significant relationship between self-emotional intelligence skills and employers' satisfaction.

The positive relationship between self-emotional intelligence skills and employers' satisfaction was presented in H6. Based on the analysis in Table 4.32, it is found that self-emotional intelligences skills are important for engineering graduates. The results show a significant relationship between self-emotional intelligences skills and employers' satisfaction (B= 0.138, p=0.048). Hence, self-emotional intelligence skills of engineering graduates is another factor to hire engineering graduates at the entry-level. The result also shows that engineering graduates must have the skills to deal with others with honesty and integrity. At the same time, this result shows that employers are satisfied with the self-emotional intelligences skills of engineering graduates.

The results, in essence, are inconsistent with those of past studies conducted by Slaski (2003) and Parker *et al.* (2008), which collectively recognize that graduates can perceive, comprehend and control their emotions and those of others, and integrate these with their own thoughts and actions. In addition, it is different from this study that have found that self-emotional are important in determine the employer satisfaction especially in terms of honesty and integrity in themselves. George (2000) indicated the capability to understand and manage emotions in oneself and others

improve a graduate's ability to solve problems and affect their juniors' emotions, thus enabling the graduate to grasp chances, address issues, introduce change and promote effectiveness in an organization.

In the same vein, educationalists who encouraging emotional intelligence skills stress the positive individual differences, problem solving skills, teamwork, value, and empowering graduate engineering students to get positive social skills. Moreover, Kaufhold and Johnson (2003) indicated that emotional intelligence skills have been developed, but need nurturing and reinforcement. All those attributes reflect the graduates' personality and their commitment towards employment, which will assist them in building their good work history. Yilmaz (2009) found that to increase students' empathic skills, emotional intelligence skills training is effective.

The interpretation of findings can be related to the attributes of emotion itself that jointly focuses on self-esteem, honesty, resolving conflicts, flexibility and attitude (Fabio *et al.* 2012). Hence, graduate students in engineering need to acknowledge, assess, forecast and manage emotions in way that will enable their employment in organizations and meet employability skills needed by managers.

5.5 Moderating Effects

5.5.1 Employers' Impression as the moderator in the relationship between Engineering Skills and Self-Emotional Intelligence Skills and Employers' Satisfaction.

H 8: The effect of engineering skills on employers' satisfaction is highly moderated by employers' impression – not support

The present study is designed to ascertain the moderating effect of employers' impression on the relationship between engineering skills and employers' satisfaction as proposed in H8. Based on the analysis in Table 4.33, it is found that engineering skills is B=.105, p=.080, and thus does not support employers' satisfaction moderated by employers' impression. This means engineering graduates who are already equipped with engineering skills are ready to enter the work environment. This finding is consistent with other studies that have indicated that graduates need to keep themselves up-to-date with engineering skills. This study's results concur with the findings of a number of previous studies (Ismail, N.A., 2011; Kalafsky, 2008; Jackson, 2013; Rao, A. A. *et al.* 2011; Yuzainee *et al.* 2010; Basri *et al.* 2012). For instance, Yuzainee *et al.* (2010) emphasized that employers' evaluation of engineering skills may make graduates understand what is needed in the industry.

Its mean, with the engineering skill alone is not a guarantee that engineering graduate can impress employer satisfaction. In others words, with the engineering skills itself was not a guarantee for engineering graduates to be hired by the industry. Even though logically, with the engineering skills have been equip to the engineering graduate accordingly and have been groom and polish according to the curricula from the HEIs is not enough to be a ticket to be hire by the employers. That means, engineering graduate need to equip they self-not only which the engineering skills they learn, but also others skills demand by the industry in the labor market today.

Moreover, which engineering skills that seem as the important skills that a must to be equip to the engineering graduates has shown not satisfy the employer itself. Its must add with others skills that are essential to the engineering graduates to hired by the employer such the concept of KSAOs. This finding a not consistent which the finding of this study without the employer impression as the moderator. Its show that employer are not necessary impress with the engineering skill although engineering graduate have been ready with the engineering skills. In others word, the certificate lonely is not enough for engineering graduate to be hired as a guarantee, but it's also need others skills to be equip to the engineering graduate to make employer satisfy to the skills of engineering graduate.

In general, some of the employers' evaluation techniques, like problem solving, critical thinking, and engineering skills, will produce productive workers, elevate the company productivity and aggregate economic activity. Graduates will benefit on employability, primarily in enhancing one's chances of gaining employment and collective benefits, for the whole organization.

H12: The effect of self-emotional intelligence skills on employers' satisfaction is highly moderated by employers' impression. - Support

The present study is designed to determine the moderating effect of employers' impression on the relationship between self-emotional intelligence skills and employers' satisfaction as proposed in H12. Based on the analysis in Table 4.33, it is found that self-emotional intelligence skills (B=.270, p=.001) supports employers' satisfaction moderated by employers' impression.

In another words, employer impression is important as an effect to the employer satisfaction for Self-emotional intelligence skills. Its show that which the effect of the employer impression to the Self-emotional intelligence skills, it have strengthen the employer satisfaction toward the engineering graduates. Its means, which this skills, the engineering graduate a more favorite to be hired by the industry. At the same time, its show that, employer impression is essential to determine the employer satisfaction regarding the Self-emotional intelligence skills of the graduate and consistent which the finding from this study. No doubt, which the effect of the employer impression, the Self-emotional intelligence skills will get more opportunity to be hire by the industry with the skills, they need.

Another important finding is about the control level of emotional skills perception of engineering graduates at the workplace, and the employers' expectation on each skill

level of importance required in engineering graduates. At the same time, employers' satisfaction and expectations are essential in ascertaining the relevant employability skills. Emotional intelligence skills can ease adaptive problem solving, problems framing and flexibility and creativity use to find solutions. At the same time valuing own emotional experience internally and of others'. The meritocratic posturing in education is that those who possess the most skills and the most advanced skills, are highly attractive to employers and are rewarded with a job.

5.5.2 Employers' Impression as the moderator in the relationship between Fundamental General Skills, Interpersonal Skills, Behavioral Skills and Adaptive Skills and Employers' Satisfaction.

H7: The effect of fundamental general skills on employers' satisfaction is highly moderated by employers' impression. - Support

Hl 0a: The effect of interpersonal skills on employers' satisfaction is highly moderated by employers' impression. = not supported.

Hl 0b: The effect of behavioural skills on employers' satisfaction is highly moderated by employers' impression. - Support

H11: The effect of adaptive skills on employers' satisfaction is highly moderated by employers' impression. - Support

For the role of employers' impression as moderator, two hypotheses are not significant based on the analysis in Table 4.33, i.e., engineering skills (H8) is B=.105, p=.080; and interpersonal skills (H10a) is b=.097, p=.268. First, it implies that employers' impression is useful in moderating the relationship of fundamental general skills (H7) (B=.182, p=.004), behavioural skills (H10b) (B =.206, p=.003) and adaptive skills (H11) (B=.131, p=.033) and employers' satisfaction. These findings contradict the anticipated moderating effects of employers' impression. However, the contrary results can be attributed to the underlying assumption of the hypotheses that are based on the premise that the moderating effect of employers' impression on employers' satisfaction is evident on evaluation of graduates to be employed by managers (Mccowan, 2015; Spurk, 2016; Beenen & Pichler, 2018). Effective skills will act as a pillar of building a good relationship with subordinates and the employer.

In particular, engineering graduates should stress on fundamental general skills (reading, writing, and communicating) to reform their employability readiness and preparation programs because employers evaluate related academic skills and basic literacy skills.

Nevertheless, this finding suggests that some interpersonal skills not only affect graduates' employment status; interpersonal skills also assist in identifying and

realizing career opportunities that are then translated into better quality jobs. Beenen and Pichler (2018), however, reported that at least, interpersonal skills are perceived as a priority for the graduates of some graduate business programs, though not as high of a priority as technical or conceptual skills. More research is needed to analyze more precisely what the broader superset of interpersonal skills should be, it should not be used interchangeably. Even though in this study have found interpersonal skills is not support by moderating employer impression, it's still an important skill to be equip to the engineering graduates as a preparation to entry level of working environment. In this study also, its was found that interpersonal skills is needed for employer satisfaction without moderating by employer impression.

Moreover, Roberts *et, al.* (2015), findings that graduates with demonstrates higher levels of behavioral skills actually learn more in universities compared to others. However, some employability aspects are not taught in universities but are taught by employers and others in the workplace. Despite the varying definitions of employability skills, they encompass those behavioural skills needed for graduates to effectively manage their careers and sustain successful employment.

Employability success reflects optimism and confidence regarding graduates' capability to apply adaptive skills to a variuos of settings. Morrison and Hall (2001), drawing from Hansson, Neece, Patterson, and DeKoekkoek (1997), knowing that for older worker whos feel left and outdated of skill are difficult to adapt and change their skills. A person ability to adapt to a constant changing environment will affect one's

confidence in one's ability to change. Therefore, the ability and confidence to adjust to changing circumstances must also be strengthened.

5.6 Implications of the study

The findings of this study may have practical and theoretical implications for the engineering profession in Malaysia. Theoretically, the results of this study support previous research, which indicate that skills influence employers' satisfaction.

This study contributes to the existing body of knowledge related to employers' satisfaction. The finding indicate that fundamental general skills have a significant effect on employers' satisfaction. However, there is no significant effect of engineering skills, adaptive skills and self-emotional intelligence skills on employers' satisfaction.

In addition, the result confirm that employer impression has played its roles as a moderator in the relationship between fundamental general skills, behavioral skill, adaptive skill and self-emotional intelligence skill. However, from the result, show that adaptive skill is the only skills not significant to employer satisfaction accept been moderated by employer impression.

In addition, some of the result of the skill a contradicted with the moderator roles. The skills of engineering skills a significant to employer satisfaction; however, it is not play a role moderate by employer impression for employer satisfaction. At the same time,

interpersonal skill result a significant to employer satisfaction, however this skill not relate to the effect of employer impression for employer satisfaction.

Uniquely, this difference interaction between engineering skills and interpersonal skills moderated by employer impression have reveal that this skills not a compulsory to impress the employer. Its mean, with the engineering skills itself and interpersonal skills itself a not the main factor to employer satisfaction moderated by employer impression. Its reveal that engineering graduate must prepare them self to be more multitasking in all situation to be hired by the industry and not only depends on the engineering skills they have and the interpersonal skill only.

Next, this study find that teamwork skill is not significant due to insignificant effect and low factor loading. Due to this result, teamwork skill have been remove. Its means, teamwork skill is not the skills guaranteed that engineering graduate to be hired by employer. Even though logically teamwork was the skills need for organization to be successful in the rival challenging economic today.

Finally, this study finds that employers' impression significantly moderates the relationship between engineering skills and self-emotional intelligence skills and employers' satisfaction. However, the relationship between engineering skills and interpersonal skills and employers' satisfaction does not exist. Both practical and theoretical implications are discussed in the following sections. The implications of the present research are discussed according to the outcomes of the study.

5.6.1 Practical Implications

First, universities need to work together with employers, mostly in manufacturing industries to enhance the graduates' understanding about employability skills so that they can position themselves competitively when applying for jobs. For example, graduates need to be aware that even for entry-level jobs, self-management, commercial awareness or knowledge about the business, computer literacy, information retrieval, planning, resolving conflicts and creativity are "must-have" skills from the industry perspective. Indeed, some manufacturing organizations are already working hand-in-hand with the universities but these collaborative efforts perhaps may need to be intensified, as many graduates are still not aware of such initiatives. These include conducting talks and workshops in the universities all over the country.

Another important finding arising from this study is that the curricula and courses offered in HEIs should be revamped from time to time to reflect the wider skills and attributes necessary for employment in the modern economy. Industry players can be roped in to be part of the academic team so that students can get first-hand information and be kept abreast about the industry and the job market. In addition, these industry players can contribute meaningfully in designing courses for the universities.

Another initiative the HEIs can take on is appointing contact persons who will liaise with organizations, so that graduate employability skills can be implemented more effectively. Real and equal partnerships between the HEIs and employers must be fostered in order to narrow the gap between graduates' skills and the industry's needs.

More importantly, the continuous initiatives carried out by the HEIs and/or the government to ensure that the necessary skills are incorporated in the curricular must be met by the graduates' own efforts to acquire and hone these skills, failing which the efforts expended will be futile. As the saying goes, "you can lead a horse to water but you cannot make it drink." One possibility is for graduates to engage in experiential learning by getting involved in work (either paid or voluntary) during their semester breaks so that they can meet older people with different management styles and personalities. Such exposure to real working environment will be instrumental for positive attitude development and enhanced adaptability and/or problem solving skills among students.

5.6.2 Theoretical Implication

The main objective of this study is to determine the employers' satisfaction regarding the skills factors that are most needed for engineering graduates at entry-level in the manufacturing industry. Its primary theoretical implication is to identify important employability skills for engineering graduates as perceived by manufacturing employers. It then assimilates skill constructs, fundamental general skills, engineering

skills, interpersonal skills, behavioral skills, adaptive skills and self-emotional intelligence skills. Furthermore, the study outlines the extent of the moderating effect of employers' impression on the relationship between skills and employers' satisfaction.

By assessing the factors of skills across a large sample of engineering manufacturers, this study contributes to the human capital theory. First, this research supports four important skills ability that offer a concise theoretical explanation for when each factor matters most and why. The findings provide theoretical guidance for selecting relevant factors, depending on the employer of the human capital theory, because it is often not empirically viable to include all factors. For example, fundamental general skills is most relevant for human capital theory that emphasizes basic skills and education with a strong emphasis on relevant work skills for employability. This skill which is underpinned by the human capital theory can be summed up as an approach that provides privileges to the higher education system, advances a productivity approach to skills and education, conceptualizes change in employability, particularly in relation to the labor market and reduces the value of education to a 'return on investment'.

Moreover, although employable engineering graduates possess their own human capital, firms try to protect themselves from the movement of their human capital investments to other organizations. In other words, employable engineering graduates who possess greater amounts of skill and knowledge are likely to be more valued compared to peers with lesser skill and knowledge. It is thought that in the current

career environment, young engineers must make decisions about the cost of developing their skills and how to tradeoff between using current skills and developing new capacities. (King, Burke, & Pemberton, 2005).

Furthermore, for the moderating effect of employers' impression on the relationship between skills and employers' satisfaction, this study provides unique insights into manufacturing employers and the human capital theory. Self-emotional intelligence skills seem to be the most important skills, with moderating effects on the employers' impression, which also tend to be greater in magnitude than the effects of other factors. This addresses the need for self-emotional intelligence skills for effective employability and collaborations across disciplines. Instead of identifying this as a difference essential to industrial growth, human capital theory advocates tend to argue that graduate unemployment is merely a fault of students and failure of institutions to provide the skills engineering graduate.

As this study was conducted using Malaysia as a case, data were analyzed using the satisfaction of senior managers of the Malaysian manufacturing companies. The outcomes of this study are therefore, specific to the Malaysian context. Hence, the subsequent sections highlight the recommendations and limitations for further research.

5.7 Limitations and recommendations for further research

Although this study provides some insights into the importance of skills for employers' satisfaction, several limitations of the research must be noted. Therefore, the researcher highlights the limitations and makes recommendations for further research. First, this study is conducted on employers' satisfaction with Malaysian graduate engineers' employability. Hence, a similar study should be conducted on other skills needed. The study should be expanded to include a comparison with non-technical engineers. The non-technical engineers also need skills to be employed. The focus should be on the soft skills needed in the work environment today.

Second, future researchers should focus on the engineering jobs that will be needed in future. Skills should be developed and aligned with the changes in technology. Skills, like artificial intelligence, should be made available from now if engineers do not want to be left behind. These skills must be developed through proper planning from now to ensure the engineers are equipped with the right futuristic skills.

Third, researchers should also look to the Generation X's style of work. Their styles and skills are different due to the technological environment today. It is expected that today's technology may be obsolete in the near future, and engineers must be alert and up-to-date. Today's physical work will be no more and the focus will be on online work that can be done from anywhere and at any time. The new generation has its own style of working and new concepts of work.

Fourth, the world is changing rapidly, especially in terms of new technology being created every day in every corner of the world. It is not impossible if one day, engineering work will be taken over by robots or engineering programs. However, the very high thinking skills and knowledge of humans will be still necessary. Due to that, the curriculum in HEIs should be revised accordingly. This is needed to suit the skills of future engineers of Malaysia. If there is no new development, the Malaysian engineers will be left behind and cannot compete with other better-trained and equipped engineers. The consequences will be huge, especially for Malaysia's economy and development.

Fifth, researchers in future can widen the scope of study to Asia. With this kind of research, the kind of skills for the Asian region and the skills needed by engineers to be employed regionally can be determined. The world is becoming borderless due to globalization and this kind of study will enhance Malaysian engineers' employability internationally.

Sixthly, future studies should employ methodological triangulation by using qualitative methods, involving participant observations and in-depth interview methods, to get more comprehensive information. Personal interviews might have different results when subjects are not likely to respond to survey methods.

Seventh, the nature of survey studies and the inherent limitations associated with them apply to this study. In particular, the researcher was not able to follow up with respondents to find out why they valued certain skills and in what circumstances. Future research is needed to conduct in-depth interviews with employers about what they know about engineering graduates' skills and why certain skills are important or not important for employees.

Finally, educators are not included in the study, and no comparisons were conducted to examine similarities and differences between the perspectives of employers and educators. Educators hold the key to employability skills training. If their perspective is not aligned with that of employers, the career preparation for graduate students without skills may be off target. Therefore, future research is needed to compare the perspectives of educators and employers. Findings from such a study can be used to inform educators so that they can change perspectives and teach appropriate skills to graduates.

5.8 RESEARCH MODEL BASED ON THE FINDINGS OF THE STUDY

Figure 5.1 presents the research model based on the findings of this study. It indicates that the engineering graduates' employability in the manufacturing industry is predicted by the skills ability of the university students. The moderating role in this

study was tested through employers' impression on the relationship between six skills and employers' satisfaction.

However, only four come out of six skills are related to the employer satisfaction. The skill is Fundamental General Skill, behavioural skills, adaptive skill and Self-emotional intelligence skills. Meanwhile engineering skill and interpersonal skills a not relate for employer satisfaction moderated by employer impression.

Furthermore, researcher conclude from the research model at figure 1, have shown that certain skills is important and essential to determine engineering graduates to be hired by industry, however, there a some skill have been remove due to multi collinearity and low factor loading and it was team work and specific personal skills. From this figure also, it was clear show that employer a satisfy with the skills of the engineering graduate that have been polish accordingly, however there a some new skills have to been consider and been accept from the industry like interpersonal skill and Behaviour skills. This skills should been embedded to the engineering graduate at the curriculum they learn at the HEIs as the preparation to enter the working world.

This research model have been appear after this study have been done and test for the skills need for engineering graduate from industry. Its show that even though logically team work skills and interpersonal skill as the most skills need in the organization from engineering graduate, it was found its not relate to employer satisfaction moderated by the employer impression. Its mean, this research model have open a new

window for further investigation for the skill that seem realistic and need to equip to the engineering graduate, but in reality it was not.

Moreover, researcher also conclude, from this research model, the employer impression is vital and important to be aware from the engineering graduate to be hired by the industry. Its somehow seem very important to be as a basic figure to attract the industry with the skill have by the engineering graduates. Its mean, engineering graduates must aware and ready to impress the employer to secure the entry level to working world.

Furthermore, researcher hope this research model can be used widely as a basic framework to develop a new skill for the engineering graduate around the globe. It can be used to measure the skill need from the industry, and researcher also suggest to adapting or adopting this frameworks for the HEIs to develop necessary curriculum related to the industry demand. Moreover, others researcher also encourage to develop and further investigate the factor needed for the engineering graduates in the future using this framework.

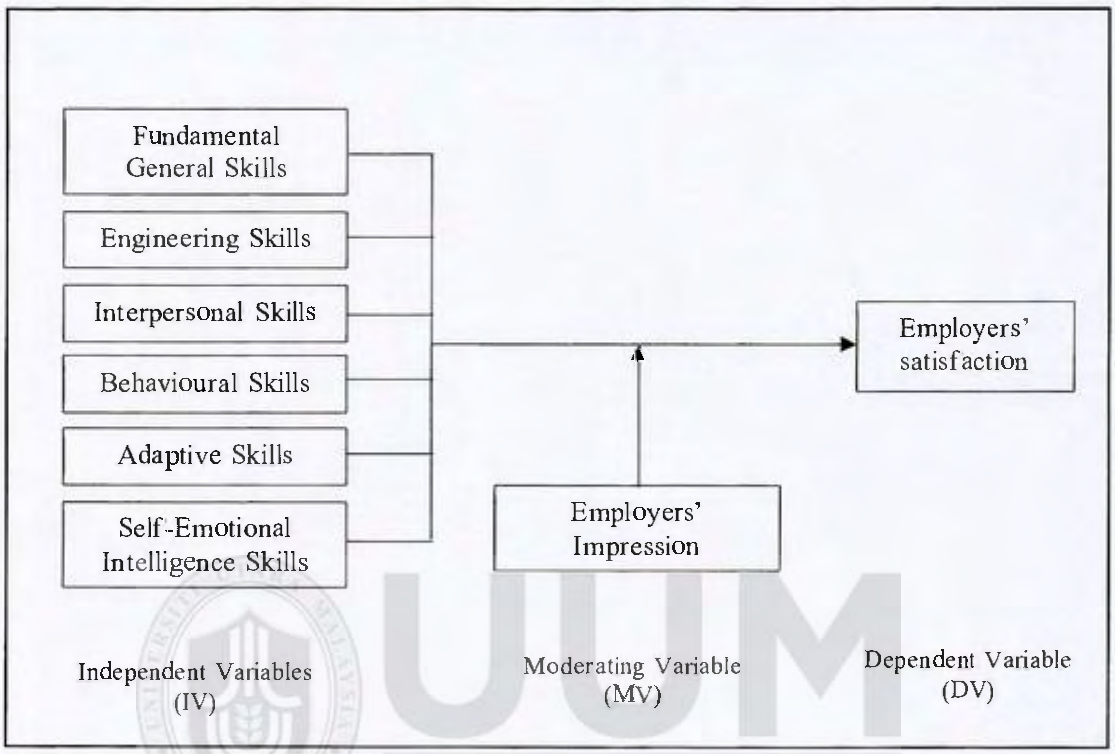

Figure 5.1: *Research Model Based on the Findings*

5.9 SUGGESTION TO MINISTRY OF EDUCATION, MANUFACTURING EMPLOYERS, HEIs AND ENGINEERS

After obtaining the findings that support several statements as hypothesized by the researcher in this study, some suggestions are made to the MOE, manufacturing employers, engineers and universities to improve graduate employability skills, particularly in the manufacturing industry. The suggestions for each party are presented separately in the next subsections.

5.9.1 Suggestion to Ministry of Education (MOE)

Firstly, this study realizes that great efforts have been made to provide MOE and policymakers with reliable information on skills requirements but there is still no clear list of skills that graduates should use to sell themselves to prospective employers. Is it in fact possible to link MOE and the labor market? Moreover, is this link desirable? Some reports indicate that employers are concerned with the lack of work-readiness (e.g., Pollard *et al.* 2015), these studies have proposed a graduate employability skills model to be adapted in HEIs.

Secondly, the assumptions of economics of conventions have considerable implications for MOE. According to Suleman (2016), the skills acquired during the time spent in the education system, i.e., the educational outputs are no longer self-evident. Within the human capital theory, education imparts useful skills that increase employees' productivity and consequently entail higher wages. Nowadays, these productive skills are no longer taken for granted.

Thirdly, the example of the survey of Greek sports employer, i.e., SESNW (Survey of Employability Skills Needed in the Workforce), seems a useful tool for the systematic recording and evaluation of employers' satisfaction of the employability skills needed in the engineering and science disciplines at the workplace (Tsitskari *et al.* 2017). Such information may help the MOE to adapt the curricula and teaching methods since

engineering and science education in universities should reinforce links with employers in order to ensure a high degree of mutual understanding and connectivity. At the same time, universities should collaborate in educational initiatives to ensure that MOE promotes engineering as a career option.

Fourthly, MOE should also look to the employer impression regarding to the engineering graduates. MOE should design and plan the new way to make the engineering graduates be impress by the employer. Its mean, the way of characteristic of engineering graduates itself must be prepare for their own to impress the employer. When the employer impress with the engineering graduate, their will going to be easier for the engineering graduate to hire by the employer. However, MOE must create a new method to polish and groom the engineering graduate to be suit to the industry demand.

Finally, researchers often use skills instead of competencies to address both acquired and required skills. Consequently, the MOE should view skills as referring to attributes that increase the employability of graduates. After all, the graduate students' ability to integrate and demonstrate employability skills has been shown to be linked to the development of their confidence in the application of new and different contexts of the working environment.

5.9.2 Suggestion to Manufacturing Employers

Firstly, manufacturing employers have indicated that all component of structures aspects of systems and technology are crucial and important. The application of technology to carry out duties among employees who serve within production field is very significant as industries use various new and latest technologies to simplify work (Sattar *et al.* 2013). It important to develop these skills for engineering and technical students. As for the aspect of personal quality, the items, 'engineering skills', 'fundamental general skills', and 'self-emotional intelligence skills' are highly important to employers and an advantage for engineering graduate to have because with these skills, engineering graduate can face any challenges in the workplace.

Secondly, the employers show their need in two different ways that can be labeled indirect and direct approaches. While the direct approach strives to collect information on skills preferences and hiring criteria, the indirect approach examines employers' satisfaction with MOE outputs, especially employers' satisfaction with graduate skills. Thus, this study proposes that employers' satisfaction with graduates' preparation can be used to ascertain the skills they value, and hence the skills that foster employability.

Finally, manufacturing organization should succeed to exploit their engineering ability via appropriate network coordination mechanisms and network structures. This reflects the emphasis on effective skills and allows manufacturing companies to build adaptable network capabilities in rapidly changing business environments.

5.9.3 Suggestion to Higher Education Institutions (HEIs)

Firstly, this study found four essential factors of fundamental general skills, engineering skills, self-emotional intelligence skills and behavioral skills. All these factors been rated highly by the employers where there are no differences among employment sectors. By understanding, the competencies expected by employers, HEIs might better align undergraduate programs with industry needs, thus enhancing the graduates' employability.

Secondly, in this study, the result shows that employers place great importance on most of the graduates' skills. Therefore, HEI lecturers should inculcate the employability skills in students. The results of these findings can be useful as a guide for technical lecturers in HEIs to plan which employability skill should be emphasized and considered important to be acquired by graduates before working in the industry. The findings can also be useful to graduates or job seekers in the manufacturing industry to be prepared for the expectations of the employers.

5.9.4 Suggestion to Engineers

It is important to involve engineering professionals to provide different points of view and experiences about the knowledge and skills needed during their professional careers. In this sense, it could be useful for engineering students to collaborate with

local industries in the definition and development of their final project. Then, engineers could serve as supervisors, and the students could have the opportunity to develop industry-relevant skills.

Yet, when looking at it as a whole, these skills are all very important (Sermsuk, Triwichitkhun, & Wongwanich, 2014). Besides, they also help every single personnel to become an efficient employee. Finally, when engineers are informed on the requirements from the employers, they should work promptly and purposefully to help establish those skills in the engineering graduates so that the students would be likely to be accepted into the world of business in the future.

5.10 Conclusion

The main contribution of this study is validating the evaluation of employers' satisfaction with skills of engineering graduates that influence employability skills needed by manufacturing firms, focusing on Malaysia. Subsequently, the factors that are important for graduate employability are identified as fundamental general skills and engineering skills.

Employers' impression was expected to moderate the relationship between skills and employers' satisfaction. The results indicate that employers' impression highly moderates the relationship between behavioural skills and self-emotional intelligence skill and employers' satisfaction. It would be valuable for future researchers to consider other factors that may moderate the relationship between graduate skills and

employability. Future research could be carried out to establish the validity of the findings of this study by replicating the research design with other samples of organizations from other industries or countries.

Nonetheless, this research specifies the factors leading to employability skills and employers' satisfaction. It is imperative for Malaysian organizations, especially those in the manufacturing industry, to comprehend the importance of graduate employability skills to acquire the best talents.

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APPENDIX

A

OTHMAN YEOP ABDULLAH
GRADUATE SCHOOL OF BUSINESS
Universiti Utara Malaysia
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KEDAH DARULAMAN
MALAYSIA

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"MUAFAKAT KEDAH"

UUM/OYAGSB/R-4/4/1
5 October 2016

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF RECOMMENDATION FOR DATA COLLECTION AND RESEARCH WORK

This is to certify that **Hasan Bin Saleh (Matric No: 94218)** is a student of Othman Yeop Abdullah Graduate School of Business, Universiti Utara Malaysia persuing his Doctor of Philosophy (PhD). He is conducting a research entitled ***"Engineering Graduate Employability Skill (EGES) : A Perception Among Manufacturing Employers in Malaysia."*** under the supervision of Assoc. Prof. Dr. Norlena Bt Hasnan.

In this regard, we hope that you could kindly provide ossistance and cooperation for him to successfully complete the research. All the information gathered will be strictly used for academic purposes only.

Your cooperation and assistance is very much appreciated.

Thank you.

"BERKHIDMAT UNTUK NEGARA"
"ILMU, BUDI, BAKTI"

Yours faithfully

ROZITA BINTI RAMLI
Assistant Registrar
for Deon
Othman Yeop Abdullah Graduate School of Business

c.c - Supervisor
- Student's File (94218)

APPENDIX

B

THE RELATIONSHIP BETWEEN ENGINEER SKILL ABILITY TOWARD EMPLOYER SATISFACTION MODERATED BY EMPLOYER IMPRESSION

Section I- Instruction

Rationale

CONGRATULATIONS!! You have been selected to participate in a survey of engineering graduate's employability because of your vast knowledge and years of experience as an employer. Your participants is very important for this research and it will provide valuable information to better prepare graduates from technical institutions.

Today, the issue of engineering graduate skills is still been debate due to the skill not align with the manufacturing demand. In term of that, this study aim to explore the employer perception regarding to the engineering graduate employability skill need in the present and future. This study important to determine the future skills needed by manufacturing industry and align with the development of engineering graduate skill to fulfill the market demand. With this study also, it is hope that the higher institution of Malaysia can use the data to predict and make planning for the new graduate skill need from the curricula development.

Completing this survey is voluntary and your response will be keep confidential and only will be used for this research purpose only. Individuals will not be identified, and only group data will be reported in writing.

Directions

This survey questionnaire have Seven (7) printed page and have three (3) sections: Section I- Instruction, section II- Background Information and section III- Engineering graduates' employability skills domains items.

Declaration

This survey is purposely used to investigate the research questions only and it was only for research purposes.

Please complete this questionnaire and return it to:

Hasan bin saleh,
Universiti Utara Malaysia,
D/A : no 17, jalan MM 1/6, Taman Merak Mas, bukit katil, 75450 melaka.
012-6701184

Sections II – Background Information- Please tick in relevance box (only one).

1. Your Gender is

☐ Male ☐ Female

2. Your age is

☐ 25 to 30 years old ☐ 31 to 40 years old

☐ 41 to 50 years old ☐ 51 and above

3. Your race is

☐ Malay ☐ Indian

☐ Chinese ☐ Others (Please specify _____)

4. What is your previous field of study?

☐ Engineering ☐ Social Science ☐ Medical

☐ Economy ☐ Management ☐ Others

5. How many years have you been working with this company

☐ 1 to 5 years ☐ 6 to 10 years

☐ 11 to 15 years ☐ 16 years and above

6. What is your current role or position in this company?

(a) Chief Executive Officer
(b) Executive Director
(c) Director
(d) Production Manager
(e) Manager

7. What is the approximate size of your company?

(a) Large (Over 500 employees)
(b) Medium (between 100 and 500 employee)
(c) Small (under 100 employees)

8. How many employees were hired last year?

( ) Less than 10 ( ) 11 to 20 employees ( ) 21 to 30 employees ( ) 40 and more

9. Which sector does your company mainly belongs to ?

Oil and gas		Power		Pharma	
Automobiles		Steel		Electronic Industries	
IT		Infrastructure		Food processing	
Biotech		Manufacturing		Paper	
Real estate		Telecom		Irrigation, dairy	
Refinery		Chemical		others	

Section III- engineering Graduates Skills Domains - Please circle one (1) appropriate response for each item.

Please read and answer each question by circling the appropriate number, rating from number 1= **Highly Not Satisfied (NS), 2= Fairly Satisfied (FS), 3= Satisfied (S), 4= Very Satisfied (VS), 5= Highly Satisfied (HS)** that reflects your perspective on the extent to which engineering graduates skills you need.

1=Highly Not Satisfied (NS), 2=Fairly Satisfied (FS), 3=Satisfied (S), 4=Very Satisfied (VS), 5=Highly Satisfied (HS)

A	Employability Skill Ability	EMPLOYERS PERSPECTIVE ON ENGINEERS SKILL AND CHARACTERISTIC				
A1	**Fundamental General Skills**	**HNS**	**FS**	**S**	**VS**	**HS**
1.	Demonstrate listening skills.	1	2	3	4	5
2.	Demonstrate highly communications skills (English).	1	2	3	4	5
3.	Able to communicate in other languages (English, Mandarin etc.)	1	2	3	4	5
4.	Knowledge of Contemporary Issue.	1	2	3	4	5
5.	Understanding information presented in a variety of forms (graphs, charts, diagram etc.).	1	2	3	4	5
6.	Use different computer applications (Spreadsheets, such as entering data, formulas, copying, linking etc.).	1	2	3	4	5
7.	Demonstrate basic computer soft skills for simple tasks (words processing, such as formatting, inserting graphic into document etc.).	1	2	3	4	5
8.	Show a good personality in term of dressing and style.	1	2	3	4	5
A2	**Specific Personal Skills**					
1.	Practice time management in completing assigned tasks.	1	2	3	4	5
2.	Demonstrate accountability to work under pressure.	1	2	3	4	5
3.	Show an ability to work under pressure.	1	2	3	4	5
4.	Commitment to life-long-learning	1	2	3	4	5
5.	Ability of balancing work and personal life.	1	2	3	4	5
6.	Learn from previous mistakes.	1	2	3	4	5
7.	Identify entrepreneurship skill.	1	2	3	4	5
8.	Graduate skill was accordance with this company need.	1	2	3	4	5
9.	Identify new approach to solve problem (Creativity).	1	2	3	4	5
10.	Demonstrate ability to work independently (Reliability).	1	2	3	4	5
11.	Maintain self-control (maturity).	1	2	3	4	5
12.	Display positive attitudes towards work.	1	2	3	4	5
13.	Demonstrate punctuality at work.	1	2	3	4	5
14.	Use appropriate occupational safety practices.	1	2	3	4	5

A3	**Engineering Skill**					
1.	Ability to apply knowledge of mathematics, science and engineering.	1	2	3	4	5
2.	Skill/ability of using engineering tools effectively (Others than Computer).	1	2	3	4	5
3.	Ability to design a system, component or process to meet desired need.	1	2	3	4	5
4.	Ability to identify, formulate and solve engineering problem.	1	2	3	4	5
5.	Ability to design and conduct experiment, analyze and interpret data.	1	2	3	4	5
6.	Demonstrate a knowledge and understanding of engineering system.	1	2	3	4	5
7.	Ability to analyze engineering design.	1	2	3	4	5
8.	Ability to apply skill, access and knowledge of science and engineering fundamentally.	1	2	3	4	5
9.	Ability to apply knowledge in multidisciplinary engineering.	1	2	3	4	5
10.	Ability to use techniques for engineering practice in work.	1	2	3	4	5
11.	Demonstrate ability to use modern/latest engineering software.	1	2	3	4	5
A4	**Teamwork skills**					
1.	Understand and align which business conducted.	1	2	3	4	5
2.	Understand the role in a group.	1	2	3	4	5
3.	Demonstrate appropriate skills in interacting with others (Supervisors, customers' service skill, colleagues and others).	1	2	3	4	5
4.	Respond to constructive criticism in group.	1	2	3	4	5
5.	Accept differences and diversity of individuals within the group.	1	2	3	4	5
6.	Contribute to a team by sharing information and knowledge.	1	2	3	4	5
7.	Demonstrate highly efficiencies leadership when needed.	1	2	3	4	5
8.	Good interpersonal relationship in teamwork.	1	2	3	4	5
9.	Function efficiency in a group as team members.	1	2	3	4	5
10.	Accept and provide feedback in constructive and considerate manner.	1	2	3	4	5
11.	Function effectively as an individual and workers.	1	2	3	4	5
A5	**Adaptive Skill**					
1.	Illustrate individual skill to resolve problem.	1	2	3	4	5
2.	Ability to show different personal skill with other graduate engineers.	1	2	3	4	5
3.	Show unique in term of skills, attitude and knowledge.	1	2	3	4	5
4.	Display individual intelligence.	1	2	3	4	5
5.	A fast learner in learning or doing job.	1	2	3	4	5
6.	Demonstrate individual creativity in work and to solve problem.	1	2	3	4	5

7.	Demonstrate high knowledge, skills, attitude and others characteristic (KSAOs)	1	2	3	4	5
A6	**Self-emotional Intelligence Skills**					
1.	Adjust to workplace changes (Flexibility).	1	2	3	4	5
2.	Practice ways to resolve conflicts.	1	2	3	4	5
3.	Display evidence of self-esteem, confidence and self-motivated.	1	2	3	4	5
4.	Show willingness to be relocated if needed.	1	2	3	4	5
5.	Show stability in term of emotional, attitude and style.	1	2	3	4	5
6.	Show positive attitude toward job.	1	2	3	4	5
7.	Demonstrate maturity and emotional stability to manage pressure and burden of work.	1	2	3	4	5
8.	Stay focus and calm in situation.	1	2	3	4	5
9.	Demonstrate works ethics that align with the workplace ethic.	1	2	3	4	5
10.	Deal with others with honesty and integrity.	1	2	3	4	5

B	**EMPLOYER IMPRESSION**					
1.	The entry-level engineer tries to show that he/she is a friendly person with good attitude and behavior.	1	2	3	4	5
2.	The entry-level engineer tries to let your think that he/she is responsible for the positive events that occur in the work group.	1	2	3	4	5
3.	The entry-level engineer tries to show you that he/she tries to do a good job with high quality in your company.	1	2	3	4	5
4.	The entry-level engineer tries to impress you that he/she is a "good" worker.	1	2	3	4	5
5.	The entry-level engineer shows the value of a positive event that you have taken the credit for.	1	2	3	4	5

C	**EMPLOYER SATISFACTION**					
1.	Satisfied with young engineers who you hired (new engineers who have less than three years of experience)?	1	2	3	4	5
2.	Entry-level engineers that your company hired are fully equipped with the necessary skills?	1	2	3	4	5
3.	Entry-level engineers who your company hired are very skilful and highly talented in engineering work?	1	2	3	4	5

4.	Entry-level engineers who have been hired by your company are well trained by Malaysian public HEIs.	1	2	3	4	5
5.	Overall, all entry-level engineers who have been hired by your company have been fully moulded according to the manufacturing company's needs.	1	2	3	4	5

Thank You for your participation

Hasan bin Saleh